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THE

DENTAL RECORD:

A

MONTHLY JOURNAL

OF

DENTAL SCIENCE, ART, AND LITERATURE,

DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY

THOMAS GADDES, L.D.S.ENG. AND EDIN.

VOL. V.

LONDON:
PUBLISHED BY
THE DENTAL MANUFACTURING COMPANY, LIMITED,
3, 4 & 5, LITTLE WINDMILL STREET, GOLDEN SQUARE,
LONDON, W.; AND
71A, GROSVENOR STREET, MANCHESTER.

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VOL. V.

(JANUARY TO DECEMBER, 1885.)

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THE

DENTAL RECORD.

Vol. V. JANUARY 1, 1885. No. 1.

COCAINE.

ON THE LEAVES OF THE CUCA OF PERU

(*Erythroxylon Coca*, Lamarck).

By C. J. Boyd Wallis, L.D.S. Eng., &c.

Writing in 1853, Dr. H. A. Weddell says, in his "Voyage dans le nord de la Bolivie," that "among the numerous vegetable riches of Yungas de la Paz,* there was none which interested me more than the *coca*, in consequence of the various, and sometimes contradictory, opinions put forth regarding it." If one may judge by the recent correspondence in the daily papers concerning the virtues of this interesting plant, these different and contradictory opinions still exist. I have therefore thought a short account of the *coca* (pronounced by the natives *cuca*) and its *alkaloid* would be of interest to the readers of this journal at a time when *cocaine* (*cucaine*) is attracting so much of the attention of the medical profession in general.

The employment of *cuca* as a masticatory goes back to the time of the first Incas, a period when it was reserved essentially for the solemnities of religion, and for the use of the monarch; none other might raise it to his mouth, unless he had rendered himself worthy by his services of partaking this honour with his sovereign. The sacrificing priest never consulted the oracles without holding some *cuca* leaves in the mouth, and throwing some into the fire which consumed the victims.

At the period of the Spanish invasion the Peruvians were accustomed to use the article as a medium of exchange; and when money of gold and silver entered into circulation, *cuca* was the principal object of commerce in the country, so that at a very early period the plant appears to have obtained a position, commercially speaking, of the first importance.

---

* *Yungas* signifies, in the Aymara language, *warm valleys*.

The *cuca* was known in Europe prior to 1569, through the accounts given by the historians of the conquest of Peru. Monardes (1569) and Clusius (1605) appear to have been the first botanists who treated on *cuca*; but the first who received in Europe authentic specimens of the plant was Joseph de Jussieu, a travelling companion of La Condamine. These specimens, sent in 1750, were examined by Antoine-Laurant de Jussieu, and finally served as types for the description which Lamarck gave of it under the name *Erythroxylon coca*.

There are some seventy-five species of the genus *Erythroxylon* which are found in Brazil, other parts of South America, and the West Indies. Some of the species are tonic, some purgative, and others stimulant and sedative in their action. The plant (see fig.) is propagated from seed, which comes up in ten to fifteen days after the seed is planted; the following year the shrub is transplanted into a specially prepared plot of ground, called a *cocal*, and at the end of a year and a half the plant affords its first crop, and continues to yield a supply for a period of forty years, and in some few cases even for a hundred years; but the greatest abundance of leaves is obtained from plants of from three to six years of age. In its wild state the plant averages about six feet in height, but in cultivation it is not allowed to attain more than about three feet. The best harvest is that occurring in March, immediately after the rains; the most scanty is that which takes place at the end of June; a third is collected in October or November;

and the leaves are collected by women and children, very much in the same manner as that of tea, which they much resemble in shape and size, but they have not the dentated margin.

Prof. Schlechtendal says, in the "Encyclopædia of Medical Science" (German, 1854), that the coca leaf is of a pale green colour, delicate texture, of an agreeable odour and an herbaceous taste, which, after a time, becomes sweet, bitterish, and rather astringent. A paste is made by the natives of the ash of maize cobs and a few other wild saline plants, in the form of cakes, like chocolate, and dried. It is then hard, and is called *tocera* or *llipta*. A piece of this is stewed with the cuca, then kneaded into the form of small balls, and kept in the bag containing the cuca. This manipulation is called *acullicar*. The pellets are taken separately into the mouth, and retained so long as they taste astringent and pungent, and are then thrown away, and another taken.

The leaves of the Erythroxylon Cuca are accredited with extraordinary virtues by the Peruvian Indians, who, being seldom without a supply, chew it throughout the day, consuming from five to six ounces in the twenty-four hours. The natives have various ways of preparing it for mastication: the leaves are usually mixed with a little lime, or the ashes of one or other of the saline plants, such as the Trumpet-tree (*Cecropia peltata*), the *Chenopodium quinoa*, or the common *Cereus*, the alkali of which eliminates the tannin from the cuca, and leaves the alkaloid free. Spruce says that an Indian with a chew of the leaves in his mouth will go two or three days without food, and without feeling any desire to sleep.

Dr. Weddell held a less favourable opinion of its virtues; he says that it does not satisfy the appetite, but it merely enables those who chew it to support abstinence for a length of time without a feeling of hunger or weakness. It is stated that its excessive use has been known to prove very injurious by producing similar effects to those occasioned by the immoderate consumption of opium and fermented liquors; whilst Tschudi says that its moderate use is rather beneficial than otherwise.

A recent writer says "that the commonly received impression in England, that cuca possesses some marvellous sustaining power, enabling great feats of endurance to be performed with a minimum of food, is entirely erroneous. It is a sedative pure and simple, and its use is no more advantageous than tobacco under similar circumstances. As used by the poorly-fed Indians, it appears to produce a kind of apathetic content; and if taken in excess the effect may be stupefying."

"In Peru the medicinal use of cuca is confined to the decoction, and taken as tea, as a remedy for indigestion. For the eyes it is not used; but it would not be surprising if the active principle of the plant was found to affect those organs specifically, *as the Indians, who use it so largely, have, and enjoy to old age, powers of vision probably unequalled in any other race.*"

The endurance and walking powers of Weston, the American pedestrian, who is, I believe, a total abstainer, so far as spirituous liquors are concerned, were attributed to his use of the cuca leaf.

In 1881, several medical practitioners in America called attention to the properties of the cuca leaf. Dr. Hicks, in the *New York Medical Journal*, expresses his surprise that cuca is so seldom employed, and states that he has found it useful in backache, with high-coloured urine, and excess of uric acid and urates; in short breathing from weakness of the muscles of respiration; and in palpitation due to dilatation or weakness of the muscles of the heart; and in the craving for alcohol, which it destroys; in headache resulting from over-exertion; and in sick headache, when given in small doses.

Dr. C. H. Poizat, in the *Medical and Surgical Reporter*, *America*, calls attention to the great value of cuca in the treatment of asthma; and it is said that, in Peru and Columbia, it is used as a remedy for the salivation and after effects of mercurial treatment.

Dr. E. R. Palmer, in the *Louisville Medical News*, 1881, says: "I was called to see an opium eater, who was in the habit of taking three grains of morphine several times a day. I tried various remedies for a day or two, and, by moral suasion, got him to reduce the dose very materially, but, much to his discomfort; about the third day, I ordered him to take coca. Imagine my surprise upon meeting him the next day with fine spirits, and only a record of one-fourth of a grain of morphine taken since my last call. He took the coca for some time, then entirely broke off from opium."

Some eighteen months ago I received a French pamphlet from Paris, upon the cuca leaf, and from what was therein written upon the subject, I was induced to obtain some of the leaves, from which I made an extract, for the purpose of testing its effect on application for the relief of toothache and headache, being a great sufferer myself at the time, but the result was not sufficiently satisfactory to induce me to continue the experiments.

I believe Mr. Thomas Christy, of Fenchurch-street, E.C., was the first to introduce the cuca leaf, in a commercial sense, into this country; and he suggested in "New Commercial Plants," 1881, that the cultivation of the *Erythorxylon coca* was well worthy the attention of our planters.

The preparations made from the green leaves of this plant are much superior to those obtained from the dried leaves, as imported.

The preparations manufactured by Messrs. Christy and Co. are—Extract from green leaves, elixirs, tinctures, and wine. "Le Vin Mariani," a well-known wine in France, is made from the cuca leaf. The wine may be made thus :—

℞. Cuca leaves, 30 parts ; alcohol (60°), 60 parts ; macerate 24 hours, and add white wine, 1000 parts ; macerate 10 hours longer, and strain.

Doses:—	Solid Extract	5 to 15 grains.
	Fluid Extract (American) ...	ʒ ss. to ʒ ij.
	Fluid Extract (French) ...	ʒ i. to ʒ iv.
	Elixir...	1 to 2 fluid ounces.
	Tincture	1 to 2 fluid drachms.
	Cucaine and its Salts ...	$\frac{1}{32}$ to $1\frac{1}{2}$ grains.

CUCAINE.—Over twenty years ago, Niemann pointed out that cucaine produced temporary insensibility in that part of the tongue with which it was placed in contact, but although the local anæsthetic properties of the alkaloid were recognised from the first, it is undoubtedly due to Dr. Carl Koller, of Vienna, that we owe the introduction of *cucaine* as a local anæsthetic to the profession. In a brief communication to the Ophthalmological Congress, which met in Heidelberg, on the 15th and 16th of September, Dr. Koller brought the subject to the notice of the society through Dr. Brettauer, of Trieste, who repeated Dr. Koller's experiments at the congress. Dr. Koller again brought the subject forward in a paper which he read at the meeting of the Vienna Royal Imperial Society of Physicians, on October 17th, 1884. Professor Wöhler, having obtained a supply of cuca leaves, collected at his suggestion by Dr. Scherzer, while engaged in the expedition of the Austrian frigate, "Novara," induced Herr Niemann, one of his assistants, to undertake the investigation which led to the isolation of the alkaloid—cucaine. This he obtained by digesting the cuca leaves for several days with strong (85 per cent.) alcohol, to which some sulphuric acid had been added. The liquor thus formed was pressed out from the leaves, filtered, and mixed with some caustic lime, which precipitated some of the chlorophyll and a waxy substance. The filtered alkaline liquor was neutralised with sulphuric acid, again filtered, the alcohol evaporated off, and the residue mixed with water, which dissolved out the cucaine in the state of sulphate, leaving a dark green semi-liquid mass, containing the remains of the chlorophyll. The cucaine was then precipitated with sodium carbonate and purified by recrystallisation from ether and alcohol. Niemann gave it the formula of C_{32} H_{20} No_{8} (old notation), but the now accepted formula, as assigned to it by Lossen in 1862, is C_{17} H_{21} No_{4} (new notation).

Cucaine forms small colourless and inodorous monoclinic crystals, which melt at 98° C.: it has a strong alkaline reaction, a slightly bitter taste, and produces upon the tongue the effect of temporary and almost complete insensibility at the point of contact. It is easily soluble in alcohol, freely soluble in chloroform and ether, but only dissolves in 704 parts of water; and it requires 1 in 20 respectively of melted vaseline and castor oil for solution. The salts of cucaine are readily soluble in water, and stronger solution may be obtained by the addition of a little acid. Experiments, so far as they have gone at present, show that the cuca leaves yield from 0·02 to 0·2 per cent. of cucaine. The salts prepared commercially are the hydrochlorate, salicylate, hydrobromate, tartrate and citrate. With concentrated hydrochloric acid, cucaine splits up into ergonine, benzoic acid, and mithyl alcohol.

Which of the salts will prove most suitable for the purposes for which the hydrochlorate has hitherto been mostly used yet remains to be definitely ascertained; but it would appear, thus far, that the other salts are similar in their effect to the hydrochlorate.

The *Hydrochlorate* is a white amorphous powder, having a peculiar odour; it is soluble 1 in 4 of water, and freely soluble in spirit. It acts as an antiseptic, and an aqueous solution will delay the putrefactive changes of animal matter.

The *Citrate* is in small white crystals of a deliquescent character; this will probably prove of most service to dental surgeons, as it can readily be kneaded into a mass with water, oil of cloves, or eugenol, for application to the cavity of a carious tooth. I have found eugenol the better of the two oils.

The *Salicylate* in solution keeps well, and is recommended for use in ophthalmic surgery.

The *Oleate.*—At the last meeting of the Odontological Society, Mr. W. Coffin stated that he intended to try the effect of *oleate of cucaine* for dental purposes. I have had no experience with the oleate. Dr. Shoemaker, of Philadelphia, an authority upon oleates, when addressing the students at Westminster Hospital, in July, 1884, stated that, in his hands, he had not found the oleates of the alkaloids, or rather, oleic solutions of them, so useful, and had especially failed to get beneficial effects from oleate of quinine applied externally. On the other hand, Dr. Squibbs believes in the value of oleate of cucaine as an external remedy for superficial neuralgias. He says the alkaloid unites directly with oleic acid, and forms a true salt. The facility with which these oleates are absorbed by sound skin, and the depth to which they probably penetrate before being too much diluted by the circulating fluids, give, theoretically, great promise for the use of such a preparation for the relief of local pain.

The *dose* of cucaine and its salts is $\frac{1}{32}$ to $1\frac{1}{2}$ grains.

There have been several independent investigations of the *physiological* and *therapeutic* effects of cucaine which have shown some remarkable results, and it is equally remarkable that the anæsthetic effects of the alkaloid should have remained so long undiscovered. However, thanks to Dr. Koller, it has now been raised from an obscure position to one of great importance and utility in the list of valuable alkaloids. It has been used internally, locally, and hypodermically, and its therapeutical value firmly established; it remains for us to extend our knowledge of its value by independent and collective investigation and experiment.

In 1872 Dr. Hughes Bennett made an exhaustive investigation into the physiological properties of Erythroxylon cuca and its alkaloid cucaine, and presented a thesis on the subject to the University of Edinburgh; and the present uses of cucaine as a local anæsthetic completely harmonise with the physiological conclusions at which Dr. Bennett arrived in 1872. These conclusions, briefly stated, were as follows:—"1st. In small doses not ending fatally, cucaine causes partial general loss of sensibility. 2nd. In doses which are subsequently fatal, it induces, prior to death, complete general loss of sensibility. 3rd. It destroys the excitability of the posterior columns of the cord, and paralyses the entire system of peripheral sensory nerves; but the anterior columns and the peripheral motor nerves remain intact. 4th. It causes spontaneous convulsions; but, unlike those induced by strychnia, they are not excited by peripheral irritation, owing to the paralysis of the sensory nerves. 5th. Special experiments proved that the nerve endings in the skin and mucous membranes were rendered inexcitable apart from any action the drug had upon the nervous centres."

Furthermore, Dr. Bennett then predicted "*that the varied and potent properties of this substance would subsequently prove a powerful and valuable agent in the hands of the physician for the treatment of disease.*" Dr. Bennett also demonstrated that the physiological properties of theine, caffeine, theobromine, and guaranine were almost identical in chemical composition, and also somewhat allied to cucaine, and that these substances, when administered hypodermically, were to all appearances the same as to their physiological properties. Should this prove to be the case, a useful substitute for cucaine may be found in one of these alkaloids.

In 1876 Dr. Ott showed that, when applied locally, cucaine acted as a mydriatic; and it has recently been proved to act not only on the eye, but on the mucous membrane of the ear, mouth, tongue, pharynx, nose, larynx, trachea, urethra, vagina, rectum, on wounds and sores, and upon sensitive dentine of the teeth. It is but slowly absorbed by the healthy skin, and for this reason perhaps its use in the treatment of neuralgia is less satisfactory than might have been expected. Injected hypodermically it deadens sensibility around the point injected, which regains its normal condition in from twenty to thirty minutes.

An aqueous solution of from two to four per cent. is generally employed for operations on the eye, and a solution of from ten to fifty may be used in operations on other parts of the body; I have used a fifty per cent. solution in spirit on the teeth and gums without any ill effect. It may be necessary in some cases to apply the solution twice, and even thrice, before the desired condition of anæsthesia is produced. Children are, as one would suspect, more susceptible to its influence than adults.

The toxic effect of cucaine appears, so far as has been shown at present, to have been exaggerated, although it has been shown to be poisonous if allowed to enter the circulation rapidly and in sufficient quantity, killing small animals by paralysing the heart. But that it cannot be classed with the poisons is shown by the fact that 23 grains have been taken without any serious effect. Dr. Koller says the effect of a solution of cucaine on the eye is at first to cause a slight sensation of warmth, with an increase in quantity of the lachrymal secretion ; both of these phenomena disappear in about half a minute, and are succeeded by a sensation of dryness of the eyeball ; sensation, both tactile and painful, is abolished in the conjunctiva and cornea, and the palpebral aperture is widened ; complete anæsthesia lasts for about seven or ten minutes, and sensation is then slowly recovered. A quarter of an hour or 20 minutes after the instillation the pupil begins to dilate ; the dilatation reaches its maximum during the first hour, diminishes markedly during the second, and entirely disappears in a few hours more. The pupil throughout continues to react to light. Cucaine does not produce the unpleasant feeling of blindness, which is the result of the use of atropine as a mydriatic. By repeating the instillation, at intervals of five minutes, the anæsthesia can be maintained for as long as may be necessary. Anæsthesia is first shown in the conjunctiva and cornea, afterwards in the iris ; it is greater in degree in the external positions than in the iris. In many of the acute inflammations of the cornea, or iris, in abrasions of the conjunctiva from foreign bodies, and in the pain following the use of nitrate of silver or cupric sulphate, the influence of cucaine as an anæsthetic appears to be very decided. Mr. D. C. Lloyd Owen, F.R.C.S.I., says that he has found with a combination of equal parts of an eight per cent. solution of cucaine hydrochlor., and of the Liq. atropiæ sulph., B.P., immediate and enduring relief given in keratitis and corneal ulcer, and also in sclers-conjunctivitis and iritis, the effect being more quickly produced and more marked than that of atropine alone, and the relief more lasting than that of cucaine.

Generally speaking, the time required for the production of anæsthesia of the conjunctiva, after a full dose, appears to be from two to six minutes, the maximum effect is reached in about 15 minutes, and commences to subside in about 30. On repetition subsequent applications appear to act with more rapidity than at first.

Space will not permit me to enter fully into details of the many successful trials which have been made of cucaine ; its anæsthetic properties seem, indeed, to have been so conclusively proved that a brief statement of a few typical cases will, I think, prove sufficient to show its value.

Notes of cases treated in October and November, 1884, by Mr. C. Bader, M.R.C.S. *(Lancet)*:—

Case 1.—Lady, aged 22, burnt both corneæ with acetic acid; exhibited extreme intolerance of light and suffered great pain. An ointment composed of chrisma (one ounce), with two per cent. of muriate of cucaine, was ordered. Immediate relief and rapid recovery followed.

Cases 2, 3.—Aged 60 and 65 respectively. Slitting of lower tear puncta and canaliculi. Five, three and one minute before operating a drop of two per cent. solution of cucaine was applied to the inner surface of the lower eyelids. The patients did not complain during the operation.

Cases 4, 5, 6.—Young ladies with convergent strabismus. The four per cent. solution of cucaine was used in one case only to one eye, to note the difference as to pain, which was most striking.

Case 7.—Tumour removed from upper eyelid. A two per cent. solution of cucaine was applied five, three and two minutes before the operation. No pain was complained of when making the incision, but the patient experienced some pain while I was crushing the tumour.

Case 8.—Double iridectomy. A four per cent. cucaine solution was applied four times in six minutes. No pain whatever at the corneal incision, but the patient felt some pain while the iris was excised.

Dr. Felix Semon states that he has met with signal success with cucaine in operation upon papillomata of the larynx.

Mr. Cowell, F.R.C.S.E., reports in *British Medical Journal*:—

Case 1.—Extraction of cataract with iridectomy. The four per cent. solution was applied three times, at intervals of 10 minutes. The conjunctiva was rendered quite anæsthetic, and the patient, a man, felt nothing of any of the steps of the operation.

Case 4.—Foreign body. A four per cent. solution was instilled three times as above; a particle of steel firmly imbedded in the cornea was removed with ease and without pain. A slight numbness and stiffness of the lids remained till the next day and then passed off. The solution did not interfere in any way with the process of healing.

The following cases, occurring in my own practice, are more specially interesting to Dental Surgeons:—

CASE 1.—Miss ——, aged 28. Lower first right molar, nerve nearly exposed and painful; pain immediately relieved by application of twenty per cent. solution of cucaine in spirits of wine, nerve painful on pressure, though not to touch half an hour after. A second application of the solution with arsenious acid, left until following day, when nerve was removed and tooth filled without pain.

CASE 2.—Lieutenant ——. Badly decayed upper molar, and painful; treated with 25 per cent. solution, which did not destroy sensibility; repeated application a second and third time with ten minutes' interval; finally prepared cavity with very trifling pain.

CASE 3.—Mrs. ——. Very sensitive left bicuspid; two applications, 25 per cent. solution, practically useless; filled temporarily with cement. Teeth fairly good all round, hard, and yellowish; rather sensitive at the necks.

CASE 4.—Miss ——, aged 30. Whitish teeth, dentine soft, and highly sensitive. Upper left canine and first molar; painful on operating, immediate relief on application of 50 per cent. solution; in ten minutes removed surface of decay, and repeated application a second and third time; operation successful without pain. Patient nervous and excitable; expressed agreeable surprise.

CASE 5.—Mr. ——, aged 27. Upper right wisdom, nerve all but exposed; treated twice in half an hour with 50 per cent. solution; finally had to apply arsenious acid with cucaine made into paste with *Eugenol*. Second visit two days later; had no pain, removed pulp and filled without pain.

CASE 6.—Miss ——, aged 17. Upper right and left first bicuspids, whitish soft teeth, highly sensitive; applied simple 50 per cent. solution of cucaine to the left bicuspid, and cucaine with eugenol to right bicuspid; result in 15 minutes decidedly more satisfactory with the eugenol application. Prepared teeth without pain; repeated dressing as before, and left them for 15 minutes, then filled with Eckfeldt and Dubois' amalgam.

CASE 7.—Mr. ——. Upper left second molar, distal cavity, nerve quite exposed and painful to touch; treated with thin paste of cucaine and eugenol twice, with interval of ten minutes; pulp then removed without any more pain, apparently, than occurs at the moment of separation of the nerve after the use of arsenious acid.

To sum up briefly, my experience thus far leads me to believe that, although we have undoubtedly obtained in cucaine a valuable addition to our Dental Materia Medica, we shall find it to be of less use in Dental than in Ophthalmic surgery. Its disadvantages, as they appear to me, in Dental surgery, are its *transient and superficial* effect upon sensitive dentine, and *the time required*, in the majority of cases, for it to act sufficiently to enable the operator to remove the diseased portion of the tissue without pain. On the other hand, I have found it give instant relief to acute pain in the teeth, and therefore it may be expected to prove a valuable and general remedy for odontalgia when its present prohibitive price shall become greatly reduced. So far as my experience has gone at present, I have found it to act, as one might expect it to do, much more readily in whitish and highly sensitive teeth than in those of a hard and yellowish character. I have found eugenol to act as an excellent medium for its application ; and a compound of arsenious acid, cucaine and eugenol, acts well and painlessly. Unlike arsenic, cucaine does not appear to interfere with vitality at all ; and, unlike atropine, its effects are very transient.

Belladona is a valuable agent in *acute inflammation*, by relieving in the most direct way capillary congestion and stasis ; it has a topical influence in relieving both the irritation of active congestion and the congestion itself, by diminishing the calibre of the vessels and accelerating the flow of blood through them. It acts to some extent as an anæsthesiant ; and since its alkaloid increases the duration of the effect of cucaine, I am inclined to think, though I have not tried it, and merely offer the remark as a suggestion, that we shall find a valuable combination in *cucaine*, *sulphate of atropiæ and eugenol*, or perhaps an oleate of these.

Cucaine appears to me to act differently upon different persons, that is, its action appears more pronounced, and it affects some patients with greater rapidity than others. I painted a square half-inch of that portion of my arm where the skin appeared thinnest, three times (10 minutes intervals) with a 50 per cent. solution, and the surface became insensible to the prick of a lancet, but on passing just through the skin, pain was felt as without the application. I found it give great relief to pain arising from an open sore, the consequence of an in-growing toe-nail.

Cotton-wool, or bibulous paper, saturated with a strong solution and dried, appears to retain its activity for days, if moistened again on application, and probably will prove to do so indefinitely; this fact may prove it to be of use in this form to Dental Surgeons.

Its present price, generally speaking, is 2s. 6d. per grain; but it may be obtained in quantity of Messrs. Christy & Co., of Fenchurch Street, E.C., at 2s. per grain.

NECROSIS AND PARALYSIS OF DENTAL NERVE FOLLOWING ABSCESS AND TOOTH EXTRACTION.

By W. J. Pidgeon, L.D.S.Eng.

The following case came under treatment at the Leeds General Infirmary to-day, October 18, 1883:—

The patient is a man aged 50, who, about the middle of August last (1883) began to suffer from pain and swelling in the region of the first left lower molar. His symptoms became distinctly those of alveolar abscess. These continued for a fortnight, when he went to a Dentist and had the tooth drawn. Great force was used to remove it, and the operation was a protracted one. After this the swelling did not decrease, and the pain became worse. At the same time pus began to ooze from the socket whence the tooth had been extracted, and the patient lost his appetite and became gradually thinner. This morning he was seen by the Dental Surgeon to the Infirmary, Mr. T. S. Carter, who found he was suffering from paralysis of sensation in the jaw and chin, on the left side, anteriorly to the position of the extracted tooth.

After making a longitudinal incision in the gum, Mr. Carter removed, by means of an elevator, a sequestrum, measuring about one inch in length, from a third to half an inch in depth, and a third of an inch in width, consisting apparently of the sockets of the first and second molars, the latter of which teeth had been extracted some time previously. He then prescribed a mouth-wash of permanganate of potash, and asked him to report on the progress of his case. The patient has not been the subject of any bone mischief before, nor has he suffered from any disease, nor taken any medicine, that might have predisposed him to necrosis. Neither has he received any violence to the jaw beyond that attending the severe extraction before alluded to. The tooth which gave rise to the alveolar abscess shows perforation of the pulp-chamber by caries and slight exostosis of one root.

December 3, 1884. To-day Mr. Carter has received a note from the patient, in which he says that sensation is nearly completely restored to his chin. It is now thirteen months since the sequestrum was removed.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. BOYD WALLIS, L.D.S.Eng, &c.

(Continued from Vol. IV.)

PART XIII. — DYNAMO-ELECTRIC MACHINES.

BY "Dynamo-Electric Machinery," in the general sense of the term, is meant machinery for converting the energy of mechanical motion into the energy of electric currents, or *vice versa*. This wide definition does not apply to machines like the well-known statical-induction machine of Holtz, whose action is purely electrostatic, but only to those machines whose action is dependent on the principle of electro-magnetic induction, discovered by Faraday in 1831.

The dynamo of the present day is produced in so many forms that it would be impossible to enter fully into a description of its history, principles, and construction in the pages of this journal, as it would involve far more space than is at command. Therefore, only such information as may be of interest and use to the greater number of readers will be given. *Dynamos* may be divided into five classes, viz. :—

1. Magneto-dynamos.
2. Separately excited dynamos.
3. Series dynamos.
4. Shunt dynamos.
5. Compound dynamos.

They are usually treated under two heads, as *magneto-electric* and *dynamo-electric;* the first of these depends upon permanent magnets, and the second upon electro-magnets excited by the current generated in the machine. All consist essentially of two systems.

1. The *magnetic field*, which may be produced either by steel

magnets or electro-magnets, but which it is desirable to make as powerful as possible.

2. The *armature*, which takes up the force of the field and converts it into electromotive force.

The word dynamo includes all machines which employ mechanical energy to generate electric current, but the term magneto may be conveniently used to classify, as a sub-section, machines with permanent magnetic fields.

History.—The electric motor was invented over fifty years ago, and although the first inventor is a matter of some dispute, it probably originated with Faraday's discovery (1831) of the induction of currents in wires by moving them across a magnetic field; and it is said that in the following year (1832) Hippolyte Pixii, of Paris, produced the first machine for doing this practically. It consisted of an ordinary horseshoe magnet, under the poles of which a powerful horseshoe was rotated by a shaft; thus an electric impulse was produced in each half rotation in the opposite direction in the wire. The commutator devised to bring these *alternating* currents into one direction, consisted of a spring attached to each end of the wire pressing upon a metal cylinder carried by but insulated from the axis; these two cylinders were cut away as to half their circumference for half their length, so that when placed upon the axis they overlapped each other, and were separated by a small interval, thus forming a complete cylinder, except for these small intervals or gaps. Two other springs pressed on opposite sides of the axis, so that one of them was always in contact with one half cylinder, and as the axis revolved it touched alternately one or the other, and changed this contact just at the moment of change of direction of current in the wire; therefore each spring was always in contact with that end of the wire which was + or –, and being connected to the binding screws, delivered a current always in the same direction. This machine, imperfect as was its construction mechanically, contained all the essential elements, and fulfilled the essential principles of the conversion of mechanical energy into dynamic electricity.

Saxton, of Philadelphia, reversed the construction of Pixii's machine in 1833, by fixing the permanent magnet and rotating the armature, which, while in no way altering the principles, simplified the action by putting the lesser weight in motion and dispensing with two of the commutator springs, because the wires, moving with the axis, were connected direct to the cylinders instead of through springs.

In 1834, Clark, of London, introduced another modification of this machine, which is still known in scientific instrument shops as the "Medical Magneto-Electric Machine." In this machine the permanent magnet is fitted in a box, and the electro-magnet rotates over the sides of the permanent magnet instead of across its poles.

J. S. Woolrich produced in 1841 the first practical machine for large currents and engine power; this was practically a compound Saxton machine with several magnets arranged on a frame, and a like number of electro-magnets rotated on an axis.

In 1856 Siemens introduced his **I** armature, or *core* as it is called, to distinguish it from the *armature* of his recent machines, which are of a different type. By this invention the loss of power by friction of the air is minimised.

Holmes's machine, in which no new principle was introduced, was patented in England in 1856, and six years later was used at the Dungeness Lighthouse. This was the first successful and permanent use of the electric light in England.

In 1860 Pacinotti brought out his new invention, which marked the year as an important epoch in the history of the dynamo; for it is the prototype of many of the best modern dynamo machines, although it was intended for a motor to be worked by a battery. In this machine Pacinotti conceived the idea of a *continuous ring* rotating in the magnetic field, with the induced magnetic poles always fixed in one spot, though the iron in which they existed was being constantly changed, and fresh coils of wire brought under their influence.

H. Wilde made the next important step (1866) in the progress of the dynamo by his "separately-excited dynamo," Fig. 67, in which he used a common Siemens' machine with permanent magnets, but instead of using its current for work, he simply directed it into a second Siemens' machine with a large electro-magnet for its field, so as to obtain an intense magnetic field; the core which rotated in this therefore generated a much larger current, but required proportionate energy to drive it.

The next advance laid the foundation for all the later forms of machine, and was made in 1866 by Mr. S. A. Varley, Professor Wheatstone, and Dr. Werner Siemens, who simultaneously carried the idea of *accumulation* a stage further than Wilde, who depended on the current derived from one permanent magnet to generate a stronger magnet. In carrying out their ideas they commenced with the weakest magnetism, and made it generate the strongest; otherwise, made *the electro-magnet magnetise itself*, by sending the current from the armatures into the coils of the field magnet, each in turn reinforcing the other, till the maximum of magnetism was reached, starting from the small residual magnetism always present in iron once magnetised.

We come now to the year 1870, a year that marks a new era in the history and progress of electrical science, and in which the advance has been rapid and very great. Most of the machines invented in the forty years following Faraday's discovery were defective for the purposes of electric lighting, although a few of these machines have since developed into practical generators, but they are now obsolete. Pacinotti pointed out the way for the practical construction of a truly continuous current machine and the reversibility of electro-motors and generators.

The principle of self-excitation from the residual magnetism of soft iron had also been established, yet it was not until six years after the publication of Pacinotti's theory that a really continuous current practical electric generator was introduced and developed into a pure dynamo with self-exciting electro-magnets, the credit of which is due to M. Gramme. In 1872 Hefner-Alteneck brought out a new, ingenious, and highly powerful type of machine, which is now known under the name of the makers—Siemens. Then followed the labours of Lontin, Farner, Wallace, Lachaussée and De Meritens on the older forms of machines, of which the latter is the most successful; and of Weston, Farmer, Maxim, Edison, Brush, Seeley, Burgin, Schuckert, Heinrichs, Gülcher, Jablochkoff, and many others; the continued labours of Gramme and Siemens, on the newer forms, or on machines involving more or less the main principles of construction and working of the Pixii, Elias, Pacinotti, Romilly, Gramme, and Siemens generators.

Of the numerous modern machines the most famous are those of Siemens, Gramme, Brush, and Edison; and which differ chiefly in the means adopted for obtaining practical continuity in the current. In all of them the electromotive-force generated is proportional to the number of turns of wire in the rotating armature, and, to a certain extent, to the rapidity of revolution. For electro-plating, where currents of small E.M.F., but of considerable strength, are required, the rotating armatures of a generator must be made with small internal resistance, and therefore of a few turns of stout wire or ribbon of sheet copper. For electric lighting, where currents of high E.M.F. are required, the armature must be driven very fast, and must consist of *many* turns of wire, or, when very small resistance is necessary (as in a system of lamps arranged in parallel arc), of rods of copper suitably connected. There are several ways of arranging the coils upon the rotating armatures employed in continuous current machines, but although they are given as related to the series machine, they apply equally well to the armatures of any machine giving a continuous current, whether series, shunt, separately excited, or compound.

Armatures may be divided into three classes:—1. Ring armatures. 2. Drum armatures. 3. Pole armatures. The methods adopted may be classified as under:—

1. *Ring* armatures, in which the coils are wound around a ring, as in the Pacinotti, Gramme, Brush, Gülcher, and Burgin machines. In the case of the Gramme armature the ring is composed of iron wire, the insulated copper wire being coiled round and round it.

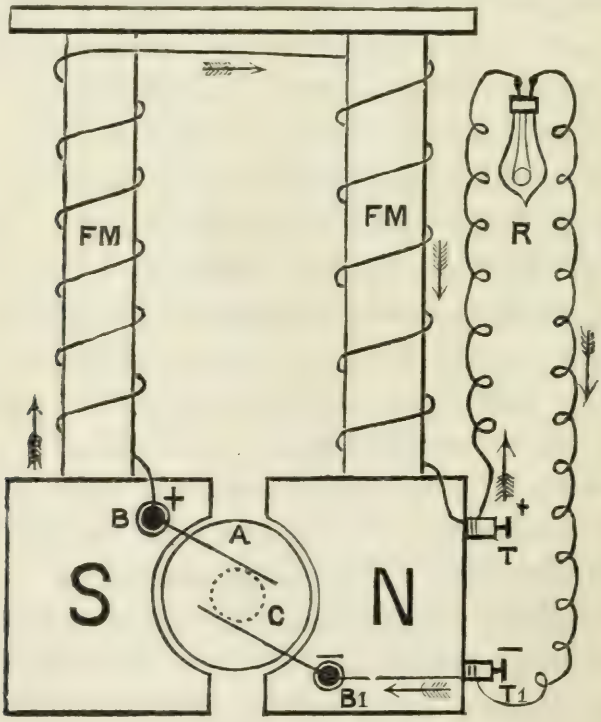

Fig. 65.

2. *Drum* armatures, in which the coils are wound longitudinally upon the surface of a cylinder or drum of wood or iron. One end

of one coil is connected to one segment or slip of the conductor, the other to the next slip, to which is also connected one end of the next coil, and so on, as in the ring armature. This armature is employed in the Siemens (Alteneck) and Edison machines.

3. *Pole* armatures, in which the coils are arranged radially with their poles pointing outwards, as in the Lontin machine.

4. *Disc* armatures, having coils arranged in or on a disc, as in the Niaudet, Wallace, Hopinson and Gordon dynamos. In one of Faraday's early machines a single copper disc, rotating between the poles of a magnet, generated a continuous current.

There are also several methods of arranging the coils of field-magnets. These may be classified as follows:—

1. *Series dynamo*, in which the coils of the field-magnets are in series with those of the armature and the external circuit. See Fig. 65.

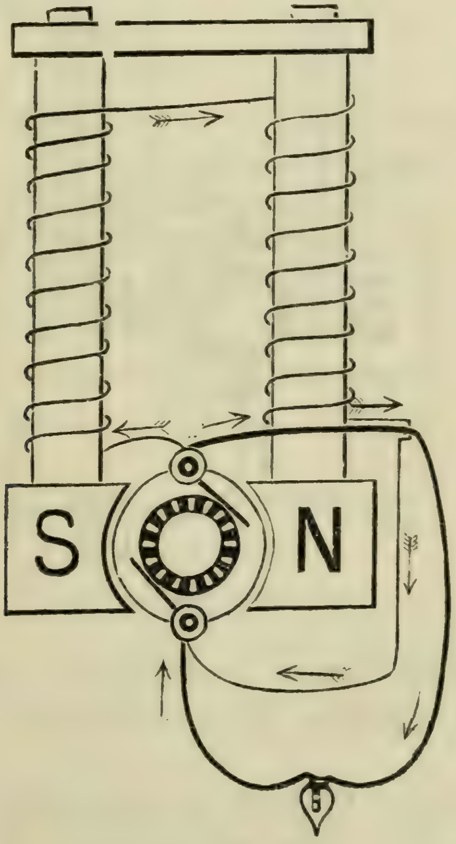

Fig. 66.

2. *Shunt dynamo*, in which the coils of the field-magnets form a shunt or shunts to the main circuit, and being made of many turns of thinner wire, draw off only a fraction of the whole current. This principle of working, known as the "shunt dynamo," is of a kindred

nature with the "series" system, and was first introduced by Prof. Wheatstone; in this machine in which, though self-exciting, only a portion of the entire current generated by the rotating armature is applied to excite the field-magnets. See Fig. 66.

3. *Separately-excited dynamo,* in which the currents used to excite the field-magnets are derived from a separate machine. This is of an earlier type than either of the preceding, having been brought out, as already stated, by Wilde, in 1866. See Fig. 67.

All these machines have their appropriate uses, according to the conditions under which they are applied. The shunt dynamo is best for arc lamps driven in series; the series dynamo, or separately-excited dynamo, for incandescent lamps worked in parallel arc.

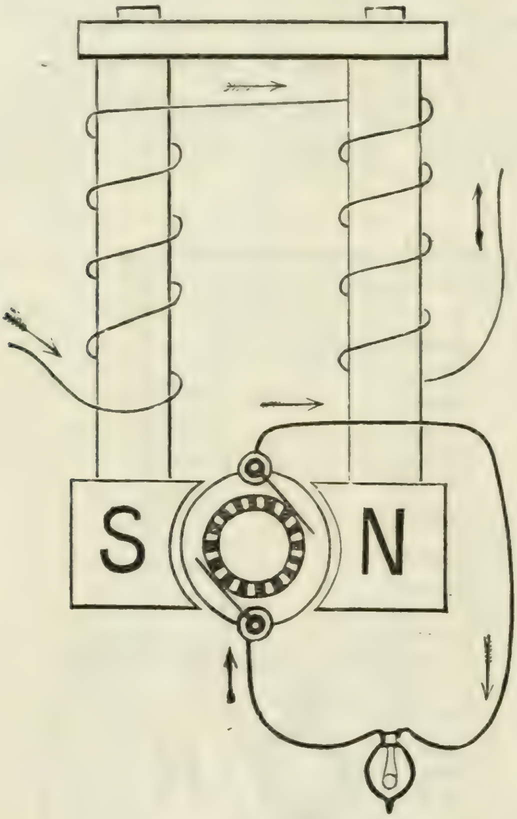

Fig. 67.

The series dynamo is the cheapest and most generally employed form of machine. It is essentially composed of an armature, A, Fig. 65, wound with insulated copper wire, and provided with a collector, C; this armature is rotated in the magnetic field produced by the field-magnets, F M. The current generated in the armature by its rotation is collected by means of brushes, B B, of wire or slit metal, which press lightly against the collector, C;

T and T_1 are the terminals of the machine, to which the external circuit is attached. This machine derives its name " series " from the fact that the armature, field-magnets and external circuit are all in series with one another.

On referring to Fig. 65, it will be seen that the armature, A, the field-mrgnets, F M, and the external resistance, R, form one unbroken circuit. The efficiency of the machine depends upon the flow of the current generated in the armature, A, by its rotation in the magnetic field, which passes by the brush, B, which may be called the + or positive brush, round the field-magnets, F M, through the external circuit, R, where the work is being done, and back through the − or negative brush, B_1, to the point whence it started. The direction of the current is shown by the arrows.

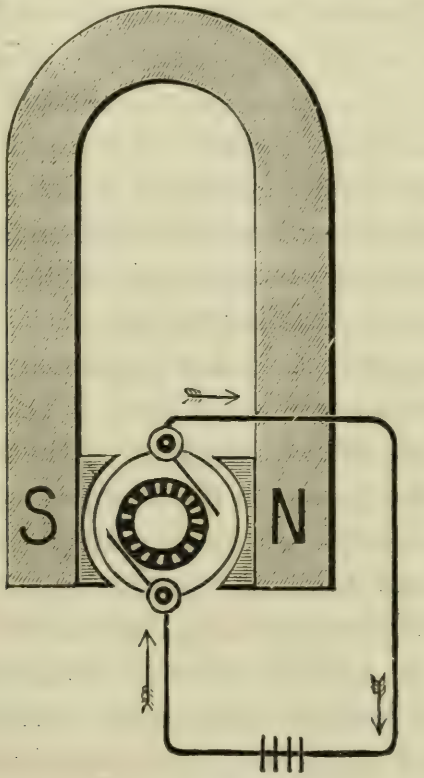

Fig. 68.

There is a fourth type of machine already referred to, namely the magneto-dynamo (see Fig. 68), in which permanent magnets are employed. In all these machines a magnet, whether permanently excited, independently excited, or self-excited, is employed to provide a field of magnetic force ; and in all of them dynamical power is employed to do the work of rotating the coils of the armatures, in order to generate the currents of electricity.

SUGGESTIONS FOR THE CONSTRUCTION OF ARTIFICIAL CROWNS AND BRIDGES.

A Paper read before the American Dental Society of Europe, at its Meeting at Vevey, Switzerland, 1884, and reported in the "Independent Practitioner."

By Dr. J. H. Spaulding, Hanover, Germany.

For the claims and pretensions of the artificial crown work I have the highest respect and admiration, because I believe that through the methods prescribed we may be able to save many teeth which have heretofore been sacrificed because we did not know exactly how to deal with them. Dr. J. L. Williams, of Hartford, Conn., has written excellently upon this subject (see *Dental Record*, Vol. iv. page 84). I shall not rehearse what he has said, but will only suggest the methods of making the gold, and gold-and-porcelain crowns for molars and bicuspids, which I am using. My manner of making the incisor and cuspid crowns is the same as his, and is, no doubt, familiar to you all.

After preparing the root so that its diameter is nowhere greater than just at the free margin of the gum, I take a narrow strip of sheet lead, or tin, of sufficient thickness to bend easily, and remain in any position, and adjust it to the root just where I want my gold crown to fit most closely. Pressing with suitable burnishers into any irregularities, and bringing the ends squarely together, I have the exact length of the gold strip which must encircle the root. Using for this 22 k. gold of about 32 English standard gauge, I now cut it off and bend it with pliers to fit the irregularities, as I did the lead, and bring the ends squarely together and solder. All this takes, perhaps, thirty minutes. I now place my gold band upon the root, pushing it up as far as I intend it to go when finished, and take an impression with this ring in position, remove the impression and replace the ring in the proper position therein, and fill with plaster. I now have a model of the case with the gold ring upon the root I am crowning. I take also an impression of the opposite jaw, to secure the articulation. With the models of both jaws, and the proper articulation, I can fit and shape my crown as I need, using strong resin wax to build up for occlusion with the opposing teeth.

When the proper shape is secured, take 24 k. gold, rolled very thin, say No. 38 or 40 English standard, and burnish over the outside of the wax, bringing the edges down outside the narrow gold ring. I now invest in plaster, and remove from the model, taking out all the wax from the inside, and flow solder over the entire surface of the inside of the crown. This stiffens the 24 k. gold, and makes it sufficiently thick to resist wear in use.

With a little polishing it is ready to put in position, and is of better shape than it is possible to secure in any other manner, save by swaging with dies, and all is done easily and quickly. If it is desirable to have a porcelain face and grinding surface, as is sometimes the case in bicuspids and first molars, I make my rings as before, only using a gold strip as wide as the full length of the desired crown. I place this ring upon the root and take my impression as above, making my models and securing the proper articulation. I now cut away from the buccal wall of the gold ring down to within a line of the gum margin, and select the proper porcelain molar or bicuspid, fit it into the ring, grinding the porcelain, or bending the gold as may be necessary, until the fit is secured. I next place my ring in position in the mouth, driving it well up, and dry off the end of the root, using the rubber dam, if possible, and fill the band with Poulson's cement, and press my porcelain face into position. Removing the excess of cement, and allowing, of course, a few minutes for it to harden, my crown is finished. In cases where necessary, I always place a headed pin in the root canal, either with cement or amalgam, before placing the crown in position ; the head of the pin is allowed to stick out, to be grasped by the cement with which the crown is filled.

No objection which has been urged against the "bridge" by its opponents can have any application to the crowns as described above, or in the article of Dr. Williams. The root, if properly treated, is as safe as any tooth which has lost its vitality, and is thoroughly protected from further decay; and, if well done upon a reasonably good root, it will take care of itself for many years. There is also a large class of teeth which are wasted by abrasion, and some forms of dry decay, almost to the point of pulp exposure, and which are not amenable to treatment that will conserve their vitality by any method of filling, and which can only be securely protected by capping.

For the principles upon which the "bridge" is constructed, and upon which it bases all its claims to public favour, I also have high respect, and I believe that under some conditions—many perhaps—the bridge, properly made, will prove serviceable, comfortable, and as cleanly as the natural teeth in the same position.

It is to the almost unlimited pretensions of the bridge-work enthusiasts that I object. They only limit themselves to "four roots in the proper position," upon which they engage to construct an entire denture, without any plate whatever.

This looks inviting upon paper, and encouraging to those unfortunates who are obliged to wear artificial teeth, and proves, no doubt, a good advertising medium, but I doubt very much the propriety of such extended bridges, and believe they will prove uncleanly, of comparatively short duration, easily broken, and with difficulty repaired, as well as very expensive.

To meet the requirements in cases where the permanent bridge is not practicable, I beg to suggest some methods which can be utilized with much comfort and satisfaction to the patient. A case commonly presenting is one where all the molars and second bicuspids of the lower jaw are gone, and is one for which it is always extremely difficult, and sometimes almost impossible, to make a plate that will set easily and remain in place, entirely dependent upon suction. If, as is frequently the case, there is decay in the first bicuspids, they are to be cut off and prepared as for the single crown. Take a sharp impression of these roots, and make a gold cap to fit the exposed end of each; make a hollow cylinder of gold, and a pin to fit the cylinder. Now, after enlarging the nerve canals, place the caps in position and punch holes through the top to correspond with the nerve canal opening, and place the cylinders, cut to the proper length, through the opening in the cap into the canals; fasten with resin wax, remove and solder. This done, place permanently in position upon the roots with cement (using, preferably, Poulson's or Rostaing's). Next place in the metal canals the pins already made to fit them, the ends projecting, and take an impression as for any ordinary plate. The pins will come away with the impression, and show exactly the position and length of the canals. Now place *upon these pins* cylinders of any metal most convenient (brass, lead, tin), and fill the impression with plaster for the model; thus you have in the model the exact counterparts of the metal canals in the mouth. You now place the pins in these canals as you did in the canals in the roots before taking the impression, allowing the ends to project as before, and proceed to make the plate as for any ordinary case. It is well to flatten, or roughen, or head the ends of the pins projecting from the canals in the model, so that the rubber—if rubber is used—will more firmly grasp and hold them. When your piece is finished it will set easily and steadily in the mouth, and is not readily moved about by the tongue or muscles, but it can be easily removed for cleansing, and the amount of plate material you need is reduced to the minimum. Another advantage is that the plate need not touch any of the natural teeth remaining in the mouth, thus preventing decay, which plates so often cause. Another case: Molars and bicuspids gone, except wisdom teeth, which are badly decayed. Grind down the crowns of these teeth, shaping them properly, and make gold caps for both, and on the top of each solder a short square pin, and when finished place in position upon the roots with cement. Now take an impression and make up your denture in the usual way, allowing the material of which the plate is composed to extend over the gold crowns, fitting closely around the pins described above. The caps over the wisdom teeth serve a double purpose; that of preserving these teeth and affording a support or fastening for the denture.

Another case shows the lower teeth all gone, except cuspids, which are either sound, or have good roots and in good condition. Extract all roots except cuspids; cut these off and proceed as before to make the gold caps with canals and pins, and place in position with cement, continuing exactly as described for the first case. When complete you have a lower denture entire, which stays where it is put in the mouth in spite of stubborn muscles and tongue, with the roots thoroughly protected and safe to support the denture for many years. If the pins should become a trifle loose by wear, they can be split and opened a little so as to spring into the canals, thus holding more firmly. The cases I have cited are only those of the lower jaw, but the same principles apply with equal advantage to any such case on the upper, or any modification of these conditions upon either jaw. These suggestions may not be new to many of the members of your society, but they will, I am sure, be of some value to many operators in America, where the custom of extracting all teeth and roots preparatory to inserting the artificial denture has more generally obtained than in Germany. That such a practice is a thing of the past there are already hopeful signs, and the employment of the methods suggusted herein is better adapted to the purse and skill of patients and operators in the ordinary walks of the profession, than the very expensive bridge requiring a high degree of skill in construction, while possessing some advantages over the latter.

NATIONAL DENTAL HOSPITAL AND COLLEGE

The Annual Dinner of the Past and Present Students of the above institution was held on Friday evening, November 28th, at the Holborn Restaurant, Mr. Felix Weiss in the chair. About seventy gentlemen were present.

At the termination of the dinner, the customary loyal toasts having been drunk, the Chairman called upon Mr. Gaddes to give the toast of the Dental Societies.

Mr. Gaddes, in rising, said that the Dental Societies of the present day were numerous, but at the same time, without doubt, the Odontological Society was the first to claim their attention. It might be regarded by them all as the parent society, and was, as most of them were aware, founded in the year 1856. Its first president was the late Mr. Samuel Cartwright, who, in his inaugural address at its first meeting, had stated that it was his belief that the society would occupy a field of usefulness and that the profession would look up to it, also that it would take rank with any existing society, and command the respect of the scientific world. The first item of that prophecy had become an established fact. The Odontological Society of the present day certainly was one which could be looked up to by all as a pattern and an example. It was also an accomplished fact that the Odontological Society was, at the present time, regarded as one of the scientific societies, and notably so when they considered that there were no less than twelve of its members Fellows of the Royal Society. (Cheers.)

The next to be considered was the Odonto-Chirurgical Society of Edinburgh, a society which was doing valuable work for their profession, and it was satisfactory to observe that its number of members was largely increasing.

They could not that evening forget the British Dental Association, and in the presence of one (Mr. J. Smith-Turner) who had done so much for it, and whose name was so closely associated with the Association, it was necessary to say very little about it; but it certainly might be looked upon as almost the firstborn of the Odontological Society, its founders being the foremost leaders of that great parent society. Its birth had been a most happy one, and certainly must be put down to the credit of the Odontological Society.

Then they had to bear in mind the Dental Students' Societies (cheers); and one which certainly was not the least amongst them being the Students' Society of the National Dental College. (Hear, hear.) The Dental Students' Societies were the laboratories in which the future members of the Odontological and of the Odonto-Chirurgical Societies were produced, and he thought they should all feel proud that they had in connection with their school a society which was really pregnant with coming members of those leading societies.

In conclusion, Mr. Gaddes said he thought he could, in justice, claim their indulgence to drink the health of the Dental Societies, coupled with the name of Mr. Williams.

Mr. Williams, in responding, thanked the gentlemen present for the way in which they had received the toast of the Dental Societies, but complained that Mr. Gaddes, who had so kindly associated his name with the toast, had, in his accustomed way of doing everything thoroughly, so spoken upon the subject as to leave him with very little to say. He, however, regarded the Students' Societies as places in which many of the students' ideas were born and nurtured for professional life, for the future good of their calling, and also for the training of members for the Odontological and Odonto-Chirurgical Societies.

Mr. J. S. Turner proposed the toast of "The Staff of the National Dental Hospital and College." In thinking over the toast he had to propose, he had come to the conclusion that it was absolutely unnecessary to say anything about the staff. He had resolved, therefore, to trust to the goodwill of his audience, and leave the staff out altogether. He thought, as they became old, they began to learn how the friction of life wore away the temper and lessened the strength in hand, and they felt how much they could sympathise with teachers who had done so much for them in their young days, and to whom they had given so much trouble and anxiety. Under these considerations, to appeal to the older members of their company that evening, he felt sure would be sufficient to ensure a hearty welcome to the toast. Then, in turning to the younger members present, he felt certain that each one had a strong personal regard for the staff, and considering the way in which they, in their close association with their teachers day by day, must have observed the self-sacrifice displayed by those gentlemen on their behalf, he could not but satisfy himself with the pleasing unction that to say anything in reference to the staff would be entirely unnecessary, as he felt sure that they were all willing to join him in drinking the health of a staff which required no words of his as a recommendation. They were fully aware that great changes had taken place within the last five or six years in connection with dental education. It had only been within that time that examinations of any magnitude had been enforced, and he simply left them to imagine what the staff of a Dental Hospital and College of the present time had to do to train up students to pass the examining bodies of the Dental Section of the Royal Colleges of Surgeons. He thought they should all feel satisfied with the progress their profession had made during the last few years, especially when they compared the dental education of the past and the present. He expressed a hope that the staff might long live and flourish amongst them, and when they passed by to make room for others, he sincerely trusted that they might be succeeded by able and worthy men such as the present staff was composed of.

Mr. Henri Weiss having thanked the company for the manner in which the toast was received, thought he could safely say that all the members of the staff endeavoured to do their utmost for the honourable profession of which they were members. With regard to the teaching at the School, it was their constant endeavour to make it as clear as possible to their students. It was, of course, quite impossible for them, for lack of time, to give the student as complete an explanation of their speciality as they as teachers felt they should like to; but at the same time he felt sure that there was not one of the students at the National Dental Hospital and College but who had an affection for their work in hand. He could not sit down without publicly thanking all of them for the extreme courtesy shown on all occasions. (Cheers.)

Mr. J. Stocken, in proposing "The Medical and Dental Schools," said he felt sure that the toast entrusted to his care was one in which all of them would feel deeply interested.

Thirty years ago a Dentist was generally regarded with contempt in professional circles, whereas at the present day Dentists were considered members of an honourable profession, having their Hospitals and Medical Schools for the training of the younger members of their calling.

When they contemplated for a moment the vast change which had taken place in their ranks, the question uppermost in their mind was one of inquiry as to the cause of so great a revolution. Amongst the many pioneers of progress they could not but remember with kindly feelings of gratitude the names of Cartwright, Rogers, Tomes, Saunders, Turner, Felix Weiss, their old friend Mr. Williams, and many others who had done much to bring about the improved condition of the dental profession. (Cheers.)

With regard to the position occupied by Dental Schools, one word might be said. They certainly had no need to feel ashamed of them. When they remembered the result of the Medical Congress of 1881, it simply remained for the students of the present day to carry on the good work and endeavour to maintain the prestige which was now enjoyed. The educational advantages offered by the Medical and Dental Schools of the present time, compared with what was in existence at the commencement of his career, made them expect greater things from the coming men; and in that expectation he trusted they would not be disappointed. They had in London two Dental Schools, and such a word as "rivalry" had been spoken of with regard to them. In that respect he hoped that there would be but one kind of rivalry, and that in the character of the gentlemen turned out and the excellence of the work done by them. (Cheers.) Mr. Stocken concluded by associating with the toast the names of Mr. Tyrrell and Mr. Rose.

Mr. Tyrrell, in responding on behalf of the Medical Schools, referred to the welcome Dental students always received at General Hospitals, and also to the advantages students had in belonging to a comparatively small Dental School. When they considered the amount of individual training which it was necessary that Dental students should receive, they found that personal attention was almost impossible in a large school.

Mr. Harry Rose also replied, and observed that the Dental Schools of London, at all events, were places in which the student could use the most modern appliances in connection with their speciality. He felt sure that all those who worked at their Dental Hospitals and Schools, and who took a thorough interest in their work, could not but have, from the special training given, a distinguished career before them as professional men.

The Chairman next proposed "The Past and Present Students," and alluded to the 31st of October, 1861, when he with others attended at Great Portland Street the first Council meeting of the National Dental Hospital. Considering the troubles and difficulties their Hospital had passed through since that time, it was pleasing to recollect the number of students that had attended the School, and to observe the elevated position now occupied by their institution. With regard to the advanced forms of Dental education, there was nothing more difficult for the Dental student of the present day than the educating of the general public in matters of Dentistry. As long as they had a public in such a gross condition of ignorance as at the present time, the best service they could render them was to educate their ideas with respect to their teeth. He had lately received a letter from a lady who requested an appointment with him so that he might re-enamel her teeth. Another, having a numerous family, had requested him to take out the nerves of her children's teeth, as she had heard that they would not suffer from those organs if such were done to them. (Laughter.) He was, however, pleased to see that the current literature of the day had in some cases taken up the question. If the coming practitioners would endeavour to their utmost to give their patients information with regard to their teeth, by so doing they would be cutting the ground from under that class of Dental practitioners that was at the present time a pest to society. (Cheers.)

Mr. A. P. Penrose and Mr. Lovitt replied, the latter observing that the students of a Dental Hospital were a much more important factor than were General Hospital students. In the latter case the business of the institution went on with or without them; whereas the student in a Dental Hospital was a necessity for the administering to the needs of the public who applied for aid. He wished, on behalf of his fellow-students, to thank all the members of the staff for their kindness to them, and to express to them the deep confidence reposed in these gentlemen by the students. He trusted it would be the effort of every student to do all he could to help on their profession in the future in the same way as gentlemen like their worthy Chairman had done in the past.

Mr. Richard Rogers proposed the health of the Chairman, and Mr. Weiss replied.

Music and recitations added to the pleasures of an enjoyable *réunion.*

THE DENTAL HOSPITAL OF LONDON.

THE ANNUAL DINNER of the Past and Present Students of the Medical School connected with the above-named Hospital was held at St. James' Hall, on Saturday, Nov. 29th, Mr. Alfred Hill in the chair.

At the conclusion of the usual loyal and patriotic toasts, the Chairman rose to propose the toast of " The Past and Present Students." He thought it was a moment for congratulation to them all when they looked back upon their past history, and compared the profession of to-day with that of years gone by. Thirty years ago, as gentlemen present that evening would verify, there were not more than six gentlemen in London as dental practitioners who could, in a professional way, shake each other cordially by the hand. What a contrast that was with the present time! They had only to look around the room that evening, and they would observe somewhere about a hundred of their professional brethren associating one with another with one common cause in view, namely, the advancement of their profession. There were before them that evening undoubtedly many gentlemen whose interest, with respect to those bygone days, was not so keen as others, and perhaps those members of their company could not be blamed when it was considered that they knew next to nothing about those struggling days, and who were simply enjoying the legacy left by their predecessors. The chairman then compared the dental profession to a ship in a rough sea which, he said, was piloted through the rough waves and breakers, and was at last brought safely into port in 1878 by their great captain, Mr. John Tomes. (Cheers.) He remarked that he was one of those who had unlimited confidence in the young men of their profession. Those who had gone out from their school had done credit to it, and he believed that they would continue to maintain the dignity of their profession, and would not forget in years to come their

"Alma mater." Mr. Hill, in conclusion, associated with the toast the names of Mr. Noble and Mr. Ackland.

Mr. Noble having replied on behalf of the past students,

Mr. Ackland said that the relations existing between the present students and the staff were exceptionally good, and he thought that was due in a very great measure to the excellent choice made in the selection of a Dean (Mr. Morton Smale).

Mr. J. S. Turner, on rising to propose the toast of "The Dental Hospital and Staff," remarked that the value of the institution and staff was being very largely recognised by the general public. With regard to the names composing the staff, it was with a feeling of sadness that they noted that several old friends had dropped out of it, and in fact the old staff had very nearly disappeared. Notwithstanding these unavoidable transitory changes, the work of their hospital staff was certainly a very important work, and every member of it did his utmost for the students, for upon those latter gentlemen would depend the class of dental practice in the coming generation.

Mr. Geo. Gregson, in responding, said it was very pleasing to note that, although there had been so many changes among the members of the staff, the lines laid down from the commencement were being worked upon successfully by the present men.

Mr. Sibley proposed the toast of "The London School of Dental Surgery and Lecturers." It was very necessary that there should be a number of trained hands ready to attend to the needs of those who applied for relief at their Hospital, and this was the good work performed by the members of the Medical School. He concluded by referring to the regretted resignation of Mr. Coleman, and the appointment of Mr. S. J. Hutchinson to the vacant lectureship.

Mr. Hutchinson, in replying, said that although now upon the staff of lecturers, he had not as yet delivered a lecture; but he sincerely trusted that when his term commenced he would command the attention and respect of the students that had been enjoyed by his much-esteemed predecessor.

Mr. R. H. Woodhouse, in proposing the health of "The Chairman," said that he felt it to be a very difficult task to do justice to the toast of their worthy friend, Mr. Alfred Hill. It was on his part quite useless to recount the many useful acts and deeds done by him, considering how well-known they were to all.

Mr. Hill having briefly replied,

Mr. Morton Smale (Dean) rose to propose "The Visitors."

Mr. Andrew Clark, Dean of Middlesex Hospital, having replied, the proceedings terminated.

During the evening selections from Sullivan's "Princess Ida," &c., were sung with great success.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

At the monthly meeting of this society, held on December 1st, Mr. J. S. Turner, president, in the chair,

The Curator announced that the Council had sanctioned the purchase of a very good skull and almost the entire skeleton of a gorilla.

Mr. McAdam, of Hereford, described a mode of regulating teeth by fitting a gold band, and fixing this to the tooth by means of an osteo cement. The band could be furnished with hooks, lugs, or studs, fixed in any required position, and could thus be readily acted upon without the risk of ligatures slipping up under the gum.

Mr. Walter Coffin showed â photograph and models of the mouth of the last surviving member of the Russian Kostroma family, a boy now aged fourteen. He was probably the most hairy member now living of the human race, his face being strongly suggestive of a Scotch terrier. He was almost edentulous, having only two canines in the upper jaw and three incisors in the lower, all temporary teeth.

Dr. St. George Elliott exhibited and presented to the museum some very curious dentures of native Japanese manufacture. They were carved out of hard wood, the front teeth being made of quartz pebbles carefully ground down, whilst the place of the molars was occupied by copper nails, by means of which most of the mastication was accomplished. Dr. Elliott said the art of making suction plates had been known to the Japanese for two hundred years, though the Chinese had no idea of it.

A communication from Mr. Oakley Coles on the use of Cocaine in Dental Surgery was read by Mr. S. J. Hutchinson. He (Mr. Coles) had received a small quantity of this drug, and had made some experiments with it which fully confirmed the statements which had been made with reference to its remarkable anæsthetic properties. One application of a 20 per cent. solution would allay sensitiveness in the dentine, and two applications at intervals of five minutes would suspend for a time the sensitiveness of an exposed pulp. It had been stated that, if used in sufficient quantity and of adequate strength, cocaine would enable an operator to remove a tooth without pain; of this he could not speak from personal knowledge, but there could be no doubt as to its utility in dental surgery. The form in which it could be best applied could only be determined by experience. It was soluble in water, glycerine, chloroform and the essential oils, but not in ether; that which he had been using was dissolved in oil of cloves. Possibly it might act best in the cavity of a tooth if used in powder or in the solid crystalline form. This, as well as the limits of its power as a local anæsthetic, could only be ascertained by careful experiments.

Mr. S. J. Hutchinson remarked that he found the application of a 20 per cent. solution remove the sensitiveness of an exposed pulp.

Mr. Woodruff and Mr. Hern said they had tried the four per cent. solution used in ophthalmic practice, but without any beneficial effect.

Mr. Storer Bennett said he had found a four per cent. solution quite useless. He then tried a mixture of vaseline with 10 per cent. of the alkaloid, and found that even after being sealed up in the cavity for 48 hours, it had produced very little effect on the sensibility. He then tried the same 10 per cent. preparation and left it a week. This had a much better effect, the patient remarking that "the tooth felt numb." He intended to try a 20 per cent. solution of the muriate, which he believed had been found much more efficacious than the uncombined cocaine. At present the price was an obstacle to its being used at all extensively, that of cocaine being 10d., and of the muriate 2s. 6d. a grain.

Mr. J. Bland Sutton, F.R.C.S., then read a paper on "Comparative Dental Pathology."

After giving some details respecting certain cases of dental disease in extinct mammals, Mr. Sutton showed two very interesting specimens of odontomes in marmots. In the first case, four odontomes were found, one in connection with each of the incisor teeth ; in the second, a large odontome was found in connection with one of the lower incisors.

In his paper read twelve months ago, he had called attention to the fact that, comparatively trivial as were the effects of alveolar abscess in man, in animals it not unfrequently proved fatal, through the purulent secretion being inspired, and setting up septic pneumonia. He now related the case of a kangaroo, the death of which had resulted from general pyæmia secondary to alveolar abscess. The most serious local effects resulting from this cause which he had met with were seen in an Esquimaux dog. An alveolar abscess had arisen in connection with the left lower second molar ; necrosis of a considerable portion of the outer surface of the jawbone had followed, so as to lay bare the sockets of the premolar teeth. The burrowing pus had also involved the sectorial tooth, which was necrosed and its fangs exposed. On the right side the sectorial and premolar teeth had disappeared, and their alveoli had undergone absorption.

He had also on the former occasion drawn attention to the fact that premature shedding of teeth in animals might result from constitutional disease. He now gave further examples in support of this. In a crab-eating opossum affected with a disease resembling mollities ossium, the teeth were so loose that on detaching the mucous membrane they all came away with it, looking exactly as though they were rows of nails driven for half their length through a strip of leather. Animals affected with rickets were liable to lose their teeth owing to extensive absorption of the alveoli. He showed as examples of this the skulls of a small species of lemur and of a marmoset. Ophidian snakes also, when kept in captivity, were very liable to lose their teeth from absorption of the "bone of attachment," by which, in these creatures, the base of the tooth is cemented to the jawbone proper. Besides being secondary to general constitutional disease, premature loss of teeth might also occur as the result of a local inflammatory affection characterised by extensive deposits of tartar, and absorption of the alveoli, with evidence of periostitis.

Cleft palate was a deformity which was not confined to man, but might occur in animals also under certain circumstances. Thus, some years ago, several of the lion cubs born in the Zoological Gardens had cleft palates. The parent animals were at that time fed entirely on horse flesh, the bones of which were too hard even for the jaws of a lion or tiger; but after goat's flesh had been occasionally substituted, well-formed cubs were born, the animals being now able to obtain a proper quantity of earthy phosphate. Frequently recurring parturitions, by causing an increased demand for lime salts, would also tend to produce this deformity in animals, and he was of opinion that the same cause might operate to produce it in man.

The subject of cleft palate in man and animals had been made the theme of some very interesting observations by Professor Paul Albrecht, of Brussels, who endeavoured to show, by reference to cases of cleft palate, that the pre-maxillary bone is developed from two centres, instead of one, as has been generally supposed. He further points out that in some cases where the cleft in the palate is double, so as to isolate the inner portion of the premaxillary bones, the median piece may develop two incisor teeth in each half, and yet an incisor tooth may be found lodged in a socket, and separated from the canine by the maxillo-premaxillary suture. From this, Professor Albrecht argues that man naturally inherits three incisors on each side, but that in the course of development the middle one on either side is suppressed. In these cases of cleft palate with an enlarged median portion there is a greater local supply of blood than usual; this extra supply of nourishment enables the usually suppressed second incisor to be fully developed, and show that that which is usually considered the second incisor is really the third. Cases confirmatory of this view had been met with and recorded by other observers, and it seemed probable that the so-called supernumerary incisors which were not very unfrequently met with might really be due to the persistence of one of these usually abortive teeth.

Comparative Dental Pathology was a wide subject and material was abundant. He hoped, therefore, that on some future occasion he might have an opportunity of bringing before the Society some further facts in connection with it.

A discussion followed, after which the Society adjourned.

JOURNALISTIC SUMMARY.

DENTAL COSMOS. *(November, PHILADELPHIA.)*

"ON CERTAIN DISPUTED POINTS IN THE DEVELOPMENT AND HISTOLOGY OF THE TEETH," by J. L. Williams. The author takes up only such points in the history of the development of the teeth as are in dispute at the present time; and he illustrates his article by several photo-micrographs. The writer undertakes to point out four important fallacies which are taught at the present day concerning the development and structure of the teeth. To this end he says: I shall demonstrate that the teeth are not developed as papillæ in a groove; that there is an enamel pulp or organ which has a definite function; that the formation of the enamel is from the line of its union with the dentine outward, and that the odontoblasts are of the nature of ganglionic elements, sending the process outward into the dentine, backward into the substance of the pulp, and probably laterally connecting them with each other. The photo-micrographs at hand enabled me to refute the teaching of Professor Garretson and others, that the teeth are developed as papillæ, in a groove which is called the primitive dental groove. Having shown the existence of an enamel pulp, and the formation of enamel not being identical with the formation of hair, nails, &c., he proceeds to show, that previous to the commencement of the formation of dentine or enamel, the dentine and the enamel pulp are in perfect contact; and also that, where the first formed lines of dentine and enamel have appeared, these tissues are in perfect contact with the ameloblasts everywhere plainly shown above the enamel. He thinks the most sceptical of his hearers must now be thoroughly convinced that the development of the enamel is from the line of its union with the dentine outwards. Concerning the exact manner in which the formation of the enamel takes place, he cannot speak authoritatively. The fact that there never can be seen but a single layer of enamel-forming cells surmounting the enamel, leads naturally to the inference that amelification occurs by secretion and deposit from these cells, and that as the ameloblasts recede before the advancing formation of enamel, remain as the persistent fibre of living matter, which Dr. Bödecker has so ably demonstrated as forming an essential feature in the histology of enamel. It is also possible that the formation of the enamel may be by an intercellular deposit and gradual elongation of the cell upward. Another proof of the glandular nature of the enamel organ is that if it be removed in the early stages of the formation of the teeth, as can easily be done in the jaws of a calf, it will be found to be impregnated with lime salts.

After the completion of the enamel at the tips of the cusps of the teeth, the enamel organ at that point is exhausted, but still remains lower down on the sides of the teeth, where the deposit of enamel is not completed, until its perfect work is accomplished, after which it entirely disappears.

The development of a tooth, then, is a modification of the methods by which both groups of the epidermal derivatives are formed. Later in the process of development, and after the completion of the crown, the pericemental membrane makes its appearance, probably originating as a transformation, either of the cells which constitute the lower part of the sac of the enamel organ or those which form the lower part of the investing capsule or tooth-sac, and the connection of the tooth with the external skin layer is again established from the pericemental membrane. The odontoblasts have been represented by Heitzmann, Abbott and Bödecker to be round or oval nucleated corpuscles between which the dentinal fibrillæ pass. Dr. Abbott has stated positively that the dentinal fibrillæ are direct prolongations of non-medulated nerve fibres, and they are so represented in his chart. Dr. Williams says, " I have long been perfectly satisfied in my own mind that they were holding erroneous views of the origin of the fibrillæ, but it was not until a few months ago that I succeeded in cutting sections so thin that but a single layer of odontoblasts was represented. These specimens have been examined by Messrs. Heitzmann, Bödecker and Atkinson. Professor Heitzmann had hardly more than glanced at one of the sections when he admitted his mistake. Subsequently, while examining the specimen under my $\frac{1}{25}$ inch objective, he thought he could detect very delicate fibres passing between the odontoblasts. But it is certainly established beyond all question that the dentinal fibrillæ proper are prolongations of the odontoblasts. The odontoblasts being of the nature of ganglionic cells, are composed of what is essentially neural matter, and are probably at the same time the active elementary agents in secreting material for the formation and continued integrity of the dentine."

" DENTO-EMBRYONAL HISTOLOGY AND TECHNOLOGY," by Dr. Xavier Sudduth. The article is concluded from the previous number. The writer deals with enamel dentine and cementum, and concludes that these tissues are secreted by special organs which persist after the formation of the different parts of the tooth ; odontoblasts as odontoblasts, cement organ as pericementum, and enamel organ, modified by change and surroundings, as Nasmyth's membrane.

"Herbst's Method of Filling," is an article translated from the *Revue Odontologique.*

"REGULATING AND MASKING DENTAL IRREGULARITIES," by Dr. John H. Meyer. In one of the cases mentioned, the patient, a lady of about 35 or 40 years of age, was considerably under-hung, and she was treated by a denture or mask adjusted to the natural teeth, on which were mounted artificial teeth ; and he believes that this construction of dental mask is unique in the history of dental prothesis, but there may be such a fact of which he is unaware.

"TRIPLEX-ACTING DEVICE FOR REGULATING TEETH," by Dr. J. N. Farrer. This is article shows the application of a screw and slip acting in three directions at the same time.

The report of the American Dental Association is continued from the previous number. Dr. W. B. Ames submitted a method of bleaching pulpless teeth by the decomposition of a solution of sodium chloride in the cavity, by means of a galvanic current and fine platinum electrodes ; and a method of disinfecting putrid pulps by the decomposition of water, acidulated with sulphuric acid—one minim to the ounce. Within the powdered mass the galvanic current is passed from a finely pointed platinum annode, placed in the canal containing the acid solution, to a sponge-covered cathode placed upon the mucous membrane adjacent.

Among other subjects discussed were dental education, periodical literature, Herbst's method of filling, &c.

OHIO STATE JOURNAL OF DENTAL SCIENCE. *(Nov., TOLEDO.)*

"RESPIRATION," by Dr. George Watt. The writer deals with the chemistry and physiology of respiration. He says vital force is manifested in organic and animal life ; the former is wholly independent of the will-power, while voluntary thought and motion are manifestations of animal life. It is probable that the oxygen associated with iron in the circulating fluid originates the vital force of organic life ; while the forces of animal life come from the action of the oxygen of reserve. Of course it is mysterious that the oxygen of reserve is rendered active by will-power at the proper time and place, so that it acts upon the proper tissues for setting forth manifestations of animal life.

"THE CHEMISTRY OF CARIES," by Dr. W. C. Wardlow. This was a paper read before the Georgia State Dental Society, in May last. The writer says he can only travel over the ground surveyed by others, and endeavour to clothe their deductions in such language as may by its novelty commend them to the mind. The various theories of caries have been so closely studied and so warmly discussed by their respective advocates, that one after another has been eliminated, until now there seems to be but two urging their rival claims before the profession: the acid and the germ theory. He freely admits the presence, and possibly active influence, of bacteria in the progress of caries, but that they are the prime and potent factor in the case recent investigations seem to disprove.

"INFLAMMATION," by Galen. The article treats upon the local symptoms, redness, heat, pain and swelling.

"A CASE IN PRACTICE," by Dr. G. W. Kelly. This was a case in which the upper laterals and first bicuspids were in close contact, and the points of the canines were just appearing through the gum wholly outside the arch. The two first bicuspids were removed, and in eighteen months afterwards the canines were in place, no assistance having been given to Nature.

"CAUSES OF DISCOLORATION IN GOLD FILLINGS IN TEETH," by W. Herbert Rollins, is an article taken from the *Boston Medical and Surgical Journal*, in which the writer mentions some of the preparations of gold, and the means he has adopted to ascertain the causes of the discoloration. He concludes that by cutting foil with steel scissors, heating on iron, handling it with steel tweezers, condensing it with serrated pluggers, burnishing with steel burnishers, are some of the sources of iron which is a common cause of discoloration of gold fillings. He also says almost all Dentists now use amalgam in greater or less quantity. This remains on the instruments in minute amounts often invisible, and when, by accident or otherwise, the same burnishers perhaps are used in making a gold filling, a little amalgam gets upon the surface, showing itself after a time as a discolored filling. That this is a frequent cause of discoloration I have no doubt, and only by performing all amalgam operations in another room, with an entirely separate set of instruments, can we hope to get rid of the trouble. As an illustration, he mentions the following case:—"An amalgam filling had been made in the morning, the hands carefully washed, and other fillings of gold made before lunch. In the afternoon a large gold filling had been almost completed, but needed a little burnishing. The gold burnisher was moistened with soap and applied to the filling, which directly changed colour. An examination of the burnisher show the same trouble. For a long time I was unable to account for the mischief. At last it was traced to the soap, to which a little of the amalgam must have clung when the hands were washed in the morning after using the amalgam."

THE DENTAL REGISTER. *(November, CINCINNATI.)*

"Dentistry in Austria," by Alma Füellgraff, D.D.S. For dentistry, the step-child of medicine, there is no chair at the university. Young men who wish to become Dentists must work for some years in a dental office, and learn the practical part of their profession, either from some one who has been formerly a barber and bone-setter, and whose chief ability consists in extracting teeth with a key, as well as with the forceps, occasionally breaking the wrong one, or a tooth that would have been of service to the patient for a lifetime, had it been properly treated; or they must learn from a physician who may be well posted in medicine, but as to his knowledge in dentistry, I may use the proverb, "Hears the bell ring, but does not know where it is hanging." In fact, as excellent as the German and Austrian universities are for the study of medicine, as poorly are they provided for the study of dentistry. Medical doctors are alone entitled to practice dentistry in Austria, and, strange to say, these Dentists do not explain to their patients or professional brothers of what immense value to the entire human system it is to save the teeth. No German, or in fact any foreigner, is allowed to put "Dentist" on his sign, unless he has graduated in dentistry in Germany. In Austria there is no free trade, consequently no chance for an American to practice in this beautiful country. Dentistry is yet a child in Europe, a weak child; in Austria it is still in its swaddling clothes; a next natural consequence of the law which nevertheless was not able to protect a score of so-called "technikers," who practice dentistry "illegally," who generally have no scientific education in dentistry or in any other branch. In Vienna there are 280 Dentists, the "technikers" included; there are also a few Dentists who have studied for a time in Philadelphia, or in some other place in America, and have associated themselves with some one (a physician, probably, who has failed to make his way), whose sign they have put at their doors, and under whose wings the Dentist may take shelter, in case any discontented or ill-disposed patient makes a fuss. For woe to the Dentist of this class who makes a mistake, for instance putting on a pivot tooth, and the patient has a swollen face afterward, he or she may run to a legal Dentist, and a score of these will raise their virtuous voices and implore the liberal laws to see to the rights of the ill-treated patients. It is clearly seen that the existence of these Dentists is spent in fear and trembling, and it is also evident that dentistry is by no means in the proper hands. In fact killing the nerve is the great war cry of the Dentists of this country, and the public not being enlightened, are contented with this mode of treatment, the more so as it did not hurt when Doctor So-and-so filled the tooth.

"HYSTERICS AND NEURASTHENIA, caused by Dental Irritation." By Dr. Sickinger, Physician in the Austrian Army In this case a lady of 40 years of age, robust, and unmarried, had never had a severe illness, nor suffered from epilepsy. After some preliminary examination, the teeth which were the object of the patient's visit were touched with a file, when she grew very nervous; the mere approach of the instrument apparently gave pain. The agitation increased rapidly, she trembled violently, she grew pale; slight convulsions of the extremities occurred, followed by complete fainting. At a second visit, though the patient was seated in an ordinary chair, the moment the healthy teeth were touched with a burnisher she declared that a fainting fit was coming on; therefore nothing of importance could be done to her teeth. Similar trouble had been experienced on a former occasion, when another Dentist had not been able to do anything to her teeth. The case is remarkable from the fact that the patient made the greatest effort to overcome her symptoms, and it is, according to the writer's opinion, a case of dental neurasthenia, or, if you like, dental hysterics.

The Report of the May Meeting of the Mad River Valley Dental Society contains a discussion on the VALUE OF PULPLESS TEETH AND ROOTS, in the course of which Dr. Geo. Watt said—We always feel inclined to say "I told you so;" and some of you may remember how I was blackguarded (about 1857-8) for putting in a great many pivot teeth. A patient for whom I put in the six anterior superior teeth in 1858, lost them in 1876. My first case was two superior central incisors for a physician's wife. They were put in about 1853, and extracted in 1871. When the Dentist came to extract for a full denture, he asked the patient how it was that the two front teeth were saved when the others were all decayed. They were the ordinary pivot teeth on a hickory pin. Dr. J. Taft filled a pulpless tooth for me 39 years ago, and although the crown is gone, the root still does service.

Dr. J. Taft—If a pulp dies it must be without any assistance from me. A physician might as well decide to kill his patient because he thought he might not get well. Never use so deleterious an agent as arsenious acid.

INDEPENDENT PRACTITIONER. *(November, NEW YORK.)*

"THE HERBST METHOD OF FILLING TEETH," by Dr. Bödecker. A description of the process is given by the writer, who says conclusions arrived at from experiments were that one of the principal requirements for the successful practice of the Herbst method is a very soft quality of gold, which, by rubbing with the burnishers, becomes cohesive. The first layers of gold that are introduced against the walls and edges of the cavity ought not to be annealed, nor even warmed, but as the filling progresses nearer the surface, or in contour operations, slight warming or even annealing will be found necessary. Cylinders are best adapted for beginning the operation. Although the body of the filling is probably not quite so solid as when done by the mallet, yet the adaptation and the walls of the cavity is much better.

"A Consideration of the Comparative Merits of Watts' Crystal Gold among Filling Materials" was the subject of a paper read before the New England Dental Society, in October last, by Dr. J. F. P. Hodson. Having used this form of gold for 15 years, the writer states that all operations which can be accomplished with any other gold or by any operator, can be as perfectly accomplished with this, and with less expenditure of force and strain, and, indeed, in every sense far greater ease of manipulation than with foil golds.

It is absolutely imperative that the first pieces of crystal gold be held immovably in the position in which they have at first been placed, and retaining points, at an angle of the cavity, may be employed for the purpose. My own very decided preference, however, and the method which I employ wherever possible, is to arrange to hold the completed stopping by the general shape of the cavity, rather than by means of the deep pits so often employed, as I greatly deprecate any unnecessary reaching out toward the pulp with conductive material. The first pieces may be held accurately to their first position by means of a pointed instrument in the left hand, continuing its employment until in condensing these first pieces and proceeding with the stopping, the shape of the cavity is found to hold the gold securely without it, condensing each piece finally as one progresses, exactly as a careful operator would proceed with cohesive foil, for, as I have before remarked, crystal gold *when first applied to the cavity* is waxy and adaptive as is the softest of soft foils, but there this similarity ends, as it should. This first application being once made, it must be treated thereafter precisely as though it were cohesive foil.

"CLINICAL OBSERVATIONS AND LABORATORY EXPERIMENTS" is the title of a paper by Dr. C. M. Wright, which was read before the American Dental Society of Europe, at its meeting at Vevey.

"THE BROMIDES IN DENTISTRY," by Dr. R. M. Sanger. In this paper, which was read before the New Jersey State Dental Society, the writer refers to the sedative and soothing action of bromide of potassium when administered internally and applied locally, pointing out its usefulness in nervous patients, and in those with irritable palates.

THE INDEPENDENT PRACTITIONER. *(December, NEW YORK.)*

"PROFESSIONAL SERVICES AND PROFESSIONAL FEES," by Dr. E. T. Darby. In this paper the writer says :—Of late there seems to be a growing belief that the dental profession offers one of the most lucrative fields in which to labour, and it is sometimes amusing to know the estimate which people place upon our work and our pay. A business man, who had several sons approaching manhood, called upon me recently to ask my advice about one of them, whom he thought of educating in dentistry. He said his son leaned towards dentistry, and as it seemed to be an easy life, with big pay, he himself believed that he could not do better than to start him in the "business." My reply to him was to the effect that if he expected his son to have an easy life, with a fat purse, he had selected the wrong calling. The two conditions are incompatible. The men who have been successful in dentistry have had laborious lives, sacrificing health, recreation, and enjoyment, and, as a rule, dying an untimely death.

But there comes a period in the life of every dentist who has been successful in attracting a large *clientele*, when the matter of fees or charges for his services becomes one of the problems which he must solve. In the earlier years of his professional career, when patients are few and his reputation yet unmade, he is better content to accept small fees than to sit in idleness. His modesty in the mater of attainments, and his timidity lest he drive some away in consequence of his charges, prompt him to keep his fees below those of other men engaged in the same calling, and often below their actual value. But when, in after years, his services are sought by greater numbers, and his appointment book is filled for weeks or months ahead, he begins to feel that his experience has enhanced the value of his services, and he instinctively puts a higher moneyed estimate upon his skill.

The English fee is a guinea for consultation, extraction, and ordinary stoppings (fillings). For the minor operations it would seem to us an excessive charge, but the expectation is that the average will be made good in the more prolonged or difficult operations. Having a given fee for each sitting, whether it be long or short, the tendency is to make it as short as possible. It is not an unusual thing for a dentist in full practice in England to see from twenty-five to fifty patients in a day, receiving from each a guinea. An American dentist would not feel that he could do justice to half that number. Patients of mine who have sojourned in England, and been in the hands of English practitioners, complain at the aggregate cost of this system of charging. Assuming that English operative dentistry is equal to ours (which it is not), the cost to the patient would be greater than the charge of the average American dentist of ability for a similar amount of work.

The French and German-American dentists have a similar fee. The usual fee in France is a napoleon, or about four dollars American money. The German dentist proper has a mixed way of charging, but the German-American dentist has a minimum charge of fifteen marks, or about three dollars and seventy-five cents. of our money, and often doubles it for a sitting of any considerable length.

It is to be presumed that in countries where amalgam and the plastics are more commonly used by the better dentists, this system would work better than with us, who use a larger percentage of gold for filling teeth. Perhaps the most just way of fixing one's charges is by the hour, or the time system, and the testimony of those who have tried it for years is to the effect that it is more satisfactory to the majority of patients. In cities, and among practitioners who confine themselves exclusively, or nearly so, to operations upon the natural teeth, it has much to commend it. It insures to the dentist pay for his time, and time is his stock in trade. It insures to the patient painstaking work, because the operator has no selfish motive to hurry. It prevents misunderstanding in the matter of accounts, for the patient can keep his own reckoning. It is more professional, for it is a charge for time and service, and not for material. It inculcates the adage that time is money, and so prevents loitering and needless conversation.

"PERSONAL RECOLLECTIONS OF A DENTIST OF THE EARLY DAYS," by Dr. L. W. Bristol. The writer recounts the difficulties and disadvantages under which the dentist laboured 50 years ago. There were then no Dental colleges, no Dental depots, no Dental instrument makers, and no regularly settled Dentists. Human teeth and bone work were worn by patients ; and Dental laboratories were sealed sanctums, within which no other dentist was ever admitted. When he looks back along the pathway he has trod in dentistry, the writer is gratified to observe the great improvements that have been made from time to time. The profession has now become a multitude of liberally educated men, ready to impart to one another all discoveries and improvements; all trying to elevate the practice.

IN addition to the Gold Medal of the Society of Arts (Siemens' Prize), the Gold Medal of the International Health Exhibition—two of the highest awards at the disposal of the jurors—was also awarded to Mr. Thomas Fletcher, Warrington, for his gas-heating and labour-saving appliances.

M. PASTEUR anticipates that bisulphide of carbon will be the most efficacious of all antiseptics, as it is also the cheapest, costing but a fraction of a penny per pound.

Editorial.

THE SUPPRESSION OF QUACKERY.

THE popular interpretation of Dentistry is, generally speaking, very vague. Too many medical men, even, might be better informed of the training required for, and the possibilities of, the higher walks of Dental practice. The present compulsory education of the Dentist side by side with that of the Medical Practitioner is rapidly having a wholesome leavening influence, and making the latter better acquainted with the scientific status of the qualified Dental Surgeon. But the acumen of the public is not notorious. Its mind is only slowly developed. Its knowledge is gained tardily, and at the expense of considerable experience. The ignorance and credulity of the community at large are the reasons for the success of the quack and the sharper. The quack-dentist has not by any means been the least successful of the charlatan class. His existence has long been known. The unwary innocents who have fallen into his trap are legion. It is now time that the days of the dental empiric should be numbered. "Each day that passes by," says Mr. C. S. Tomes, "and leaves us associated, even though it be but in name, with ignorant charlatans, is a just reproach to us."

Surely, then, it is the duty of the legitimate and educated members of the profession to enlighten the benighted public in Dental matters. It is an obligation that we owe to humanity to use our knowledge for its good. If the general public were informed of the character and allurements of the quack, people would be less likely to suffer from his infamous machinations. As the public is made cognisant of and realises the true and honourable aspect of the practice of Dentistry, so will it seek such. The axiom that "a little knowledge is a dangerous thing" has only a limited application. Knowledge is relative. The region of the undiscovered far exceeds that which is known. The professor feels too keenly how much even he has yet to learn. Knowledge is power. With the knowledge of a thing there comes its application and demand. And just as individuals possess information upon Dental matters, so will they endeavour to seek the aid of those whose education is an evidence of efficiency and honourable practice. Therefore the solicitation of Mr. Weiss, in his speech at the dinner of the National Dental Hospital (see page 30), with reference to this subject, is justified by the quotations that he gave. They are merely an example of the absurdly ill-informed condition of a large section of the community.

Information of the kind such as is here indicated has on different occasions been published by members of the Dental profession. Yet, notwithstanding the need for it—yea, verily, the duty to society to impart it—there have not been wanting expressions of opinion in high places that were, to say the least, misdirected and disappointing. It is not the pamphlet of the quack, or the self-laudatory production "post-free on application," that is here advocated or upheld; but rather that type of work which supplies correct teaching with, at the same time, as much abnegation of self as can be expected of humanity. Such a brochure should be worthy of, and meet with, the liberal recognition of the profession at large. At best, information for the populace on Dental matters is not too abundant. Compared with other subjects popularly treated, Dentistry is scarcely more than abreast with the times. There are recognised works on "Domestic Medicine," "Health Primers," "Science Primers," &c., all in the cause of public health, and written by the most able and respected men. All tend to increase the store of that subtle power—knowledge—and aid in making better men and better women. It is in this broad aspect that such books should be written and viewed. It is by teaching truth that error is to be eradicated. Honesty is the death-blow to the charlatan. Whosoever can by honest action and truth weaken the position of the empiric, duty calls!

GOSSIP.

"ANÆSTHETICS AND THEIR ADMINISTRATION" was the subject of a paper read before the Medical Society of London by Mr. Woodhouse Braine, and published in the "British Medical Journal" for Nov. 29th.

DURING the past year the Royal College of Surgeons of England examined 30 candidates for the Dental Diploma, and rejected eight of that number.

THE

DENTAL RECORD.

VOL. V. FEBRUARY 2, 1885. No. 2.

MESMERISM AND TOOTH EXTRACTION.

By JAMES W. TAYLOR, L.D.S.Edin.

AT 11 p.m., on October 18th, a young lady, Miss B., about nineteen years of age, called upon me to have the first superior left molar extracted. She was accompanied by her brother, who said he would put his sister to sleep, as there was no need that she should have any pain. After I had carefully examined the offending tooth, he made a mesmeric pass, and the light immediately died out of my patient's eyes; at the second and third passes, she was in a very deep trance, her eyes were half open, and had that peculiar misty appearance seen in the eyes of the dead. All functions were apparently stayed, the muscles were relaxed, and I had no difficulty in opening the mouth.

The tooth was very firmly implanted, with long roots curving inwards. At one time I thought the outer plate of the alveolus would come away, and I had to gradually work the tooth out.

My interesting patient made not the slightest movement, but laid back in the operating chair, as if nothing unusual had happened.

I requested her brother to awake her, at the same time drawing her head gently forward to the spittoon; in a few minutes she was her natural self again, and as soon as the bleeding ceased, she departed cheerfully.

I was surprised at the wonderful power that the mesmerist had over his subject, and would like to know if any of my professional brethren have performed any extractions under this anæsthetic, and with what results? I believe that the anæsthesia was perfect in this case.

In connection with this subject of Mesmerism and Dentistry, Mr. Henry Blandy, L.D.S. Edin., writing in the *Journal of the British Dental Association*, relates the scenes of a mesmeric entertainment he had recently witnessed. There were nine persons flat on their backs on the platform; they were completely unconscious and in perfect sleep. The questions were asked: Was this an anæsthesia applicable to general surgery or the extraction of teeth? Was it of any practical value? To both questions he was answered, yes.

Arrangements having been made, Mr. Blandy extracted two stumps on the following day, in a private room. The patient, a young woman of 25, was quickly got under the mesmeric influence, and the stumps were removed apparently without causing her the least pain.

Mrs. B., about 36, was also mesmerised into a state of unconsciousness in less than a minute, and he extracted six teeth and stumps. Mr. Kershaw, the mesmerist, in this and the succeeding operation, passed his fingers over the region of the upper and lower dental nerves, with the remark that *he could paralyse the sensation in any nerve.* As the teeth were being taken out she did not seem to feel the least pain, and they were fairly bad teeth. What is, perhaps, more strange, she could, on being asked, spit out and rinse her mouth into a basin, open her mouth, turn her head to the gas, and render every assistance that a fully conscious person could. There was no need for speculum, or hurry. The anæsthesia was lasting, and there was no disinclination to put the head back for another tooth.

There was, so far as could be judged, a perfect insensibility to pain, and yet intelligence of language—so different from any other form of unconsciousness arising naturally in ordinary sleep, or after epilepsy, or under an anæsthetic such as chloroform or gas.

Mr. Blandy remarks:—Everyone cannot thus be influenced; they are too strong-minded or too weak-minded, too bold or too nervous, too well or too ill; but if you hear of a person being mesmerised, it has been generally said he or she was very susceptible—was a poor, unstrung, weakly, and weak-minded person. Well, this greatly puzzles me. What had this mesmerist done to the woman, to give her the physical courage and endurance such as I have described. There is a confliction of ideas and manifestations in mesmerism which is very perplexing to an unbiassed mind.

This patient had no sickness or nausea, and she recovered easily after a few flips from a handkerchief, "to drive off the magnetism," as the Professor said. She had some more teeth to be removed, so I determined to desist then, and invite some other friends to witness the phenomena. I accordingly asked a few medical and dental practitioners to come on the following Tuesday morning, at the unreasonable hour of nine. I had also provided a girl of 16, a stranger to Mr. Kershaw, to be mesmerised and have teeth out. On the Tuesday morning three medical men and two dental surgeons met me at the Mechanics' Hall. Mrs. B. was again mesmerised by Mr. Kershaw, and was perfectly unconscious in fifty seconds. He standing four yards in front to make the "passes," which are simply an alternate throwing of the hands forwards and bringing them down to the knees at full stretch in regular time, the eyes being kept fixed upon the patient's face. He never winked or blinked; the long, steady gaze was quite remarkable. She became rigid in the common Windsor chair in which she sat, lolled her head over to one side, and was fast asleep. Mr. Kershaw went to her, touched her knees, or flipped them with a handkerchief; the legs loosened, and she was brought to a chair under the gaslight. Her teeth, pulse, respiration, and eyes were examined, and nothing unusual remarked. She could open her mouth and obey any direction. I took out several stumps, and then grasped an upper canine, which proved a very tight one. I had a good pull at it, and passed the forceps to Mr. G., for him to feel it was a real test tooth. He had a good tug and out it came. No one could gainsay the insensibility to pain. After some time I got the "Professor" to try and mesmerise the girl I had sent him; after a quarter of an hour she fell back into the chair behind—for he had made her *stand* in front of a good fire—and in a few minutes she rolled her head over to the right side, but soon recovered. He could not get her under then, neither did he subsequently, so that as far as my experience of the value of mesmerism in practical dentistry goes, it is a failure. I got no independent case, and even this case, had it succeeded, would not have been sufficient to form a judgment upon.

I wish to be clearly understood in this matter. This was my first contact with mesmerism, or "animal magnetism," and I did not and do not understand it. There is much introduced that smatters of humbug, yet there is much that is interesting and astonishing. One has a great difficulty in arriving at any satisfactory conclusion. I find in an article on "Anæsthetic Discovery," in the *Lancet*, June 11, 1870, p. 841, that a committee, composed of Dr. Atkinson, Inspector-General of Hospitals, Dr. O'Shaughnessy, Dr. Stewart, Presidency Surgeon of Bengal, and other men of eminence and position, reported on various experiments of mesmerism carried on under their own observation by Dr. Esdaile; some of the results were doubtful, others singularly successful. Thus in one case, on September 17th, 1846, amputation of the thigh of a man was performed during the hypnotic state by the double flap operation and seven bleeding vessels were tied; these proceedings lasted 15½ minutes, and during the whole period not the slightest tremor of a limb nor movement of the eyes or eyelids occurred. The patient became fully awake at 32½ minutes after the commencement of the operation, at 42 minutes said he was hungry, was willing to have his limb removed, and was unconscious that the operation had been already performed. In another case an hypertrophied scrotum weighing 16¼ lbs. was removed without pain, the length of incision through the skin being 38½ inches; several other remarkable cases are quoted.

NOTES FOR STUDENTS.

TAKING COLD IN A TOOTH.

By the Editor.

A frequent complaint made by patients is having "taken cold in a tooth." This common expression of a cause of suffering does not usually convey to the mind of the student any explanation of the etiology or of the pathology of the disease presented for treatment. Therefore, perhaps, a few words upon the subject may have some interest. I shall first deal with the general aspects of the question, and afterwards consider their special or local application—"Taking cold in a tooth."

Arteries and veins, consisting of three coats (elastic, muscular, and endothelial), have their muscular fibres supplied with fine nerves, called vaso-motor nerves. These nerves, with their numerous little ganglia or centres, belong to the sympathetic system. There are filaments that convey impressions to the centre, and others that transmit impulses from the centre to the peripheries or terminations. These efferent terminations may be in the involuntary muscular fibres of blood vessels, of the skin, &c. Blushing and sudden pallor are produced through the contraction and relaxation of the muscular elements of the blood vessels, which are controlled by the vaso-motor nerves.

Taking cold is a nervous phenomenon. The too rapid abstraction of heat from a surface of the body, as by a current of cool air, produces an effect upon the afferent or sensory nerves distributed to the part. Those nerves may belong to the sympathetic or tc the cerebro-spinal systems—possibly to the former. That effect or impulse is transmitted to a centre, and a current is sent therefrom along an efferent nerve to the involuntary muscular fibres of the arteries supplying the part bathed with the cool air. Consequently, those arteries contract, diminishing the amount of blood contained in them, and also in the capillary vessels proceeding from them. This, of course, blanches the surface; but the tonic contraction of the arteries may not last long, or it may continue for some time In the former case, it is soon followed by dilatation, hyperœmia, and inflammation of the same part, as is sometimes seen in cutaneous erysipelas of the face. In the latter condition, the continued contraction of the superficial vessels is quickly followed by a distention of the vessels of deeper tissues or viscera. This dilatation is permitted or controlled by the vaso-motor nerves supplying the muscular coat, and the impulse is received from the nerves of the contracted superficial vessels. In other words, when, from the cause mentioned, the vessels of the surface remain contracted, the nervous excitation is conveyed to another part, and there, by relaxing muscular fibre, induces dilatation. Hence, on going out of a warm room into the cold air, there is frequently such a rapid abstraction of heat from the surface of the body that, following upon the contraction of the vessels of the skin, there is hyperœmia of some internal structure, such as the bronchial mucous membrane, the lung, or the covering of the lung, and which, if not quickly dispersed, becomes manifest as bronchitis, pneumonia, or pleurisy. If a structure has been the seat of previous inflammation, or if it is in a hyperœmic state, it will, consequently, be predisposed to the inflammatory process—there is a weakness, a susceptibility in that direction.

A tooth, the pulp of which is decomposing, and the products of decomposition only slightly affect the periosteum, may so continue for a considerable time without giving rise to trouble. The periosteum in this case is in a hyperœmic state, and the products of decomposition are absorbed by it as quickly as they are formed. So long as the ratio of production and absorption of inflammatory resultants is equal, the patient does not complain. But suppose that the individual "takes cold," *i.e.* there is, through the vaso-motor nerves, a determination of blood from the surface to some deeper tissue. The one that is likely to be so disturbed is the already hyperœmic periosteum of this tooth, the condition of which predisposes to inflammation. With the greatly augmented blood supply to the periosteum there is increased effusion from the vessels, and not a corresponding absorption. The products of inflammation and decomposition increase, the tooth becomes tender and painful, swelling and abscess follow. The patient ascribes the cause of his condition to having "taken cold in his tooth."

When a suppurating pulp has been removed, the tooth treated and the root canal filled, occasionally slight periostitis will be experienced. This condition, which readily yields to the treatment of painting the gum with tincture of aconite and iodine, is nearly always due to the same vaso-motor nervous phenomena already explained.

The foregoing observations contain something of the *rationale* of "taking cold." Much more might have been written upon the subject, but this must now suffice.

PROSECUTION UNDER THE DENTISTS ACT.

In October last, William Robertson, Edinburgh, was sued by the Hon. Secretary (Mr. Bowman MacLeod), of the Scottish Branch of the British Dental Association, for having used the title "Dentist," he not being a registered practitioner. The defendant pleaded guilty, and his Counsel having undertaken on his behalf that he would not repeat the offence, he was fined the mitigated penalty of £5. This pledge was not long observed by Robertson, and in consequence he was again proceeded against.

In his "complaint" issued on January the 3rd, Mr. Canton, as Secretary of the British Dental Association, charged William

Robertson with having in the months of November and December, 1884, subsequent to the decision given against him on October 25th, committed six offences against the Dentists Act, in that he, not being a person registered under the Dentists Act, or a legally qualified medical practitioner, had continued to display on the railings in front of his house a brass plate with the word "Dentist" thereon, thereby implying that he was so registered; that he had a lamp on the front of his house with "Robertson, Dentist," thereon; that he had unlawfully assumed the title of Dentist in advertisements which he had inserted during the months of November and December in the *Scotsman* and *Evening News*, newspapers published in Edinburgh, and that he had generally assumed this title in defiance of the Sheriff's previous decision and sentence.

On the 9th ult., William Robertson, of 28, Rankeillor Street, Edinburgh, appeared at the Sheriff Summary Court, Edinburgh, to answer the above charges, brought against him by Frederick Canton, with the concurrence of the Branch Council for Scotland of the General Medical Council.

In reply to Sheriff Rutherford, who was on the bench, the accused pleaded "guilty."

Mr. G. H. Thoms, who appeared on behalf of the complainant asked his lordship to take into consideration the fact of Robertson's previous conviction, and read a letter addressed by Robertson to Mr. Canton, in which he stated that he had been induced to plead guilty on the previous occasion, because he had heard that two of his customers were to be brought forward against him to testify to his bad workmanship, and he feared that this, if published in the newspapers, would injure his business. He had, therefore, pleaded guilty to prevent these witnesses from appearing against him. He added, "although it is now only a fortnight since the trial, I am fully convinced that the course I took was the proper one from a business point of view, as I have gained double the support, and much public sympathy.

Mr. MacDonald, who appeared on behalf of the accused, said he admitted that it was illegal for his client to put up a sign. He had tried to convince him of it, and he believed that he would now take the course suggested. He asked his lordship to look upon the letter just read as nothing but a foolish boast.

Mr. Thoms called attention to the fact that in the letter the defendant stated that he had previously followed the business of a bicycle maker and mechanical engineer in London, so that he had another occupation to fall back upon.

Sheriff Rutherford said the Act was passed to protect the public against parties practising Denistry who had not any proper qualification, and to afford security to the public, that those who did so practise were properly qualified as Dentists. It appeared that as recently as the 25th of October last, Robertson had been convicted of offences similar to those to which he had now again pleaded guilty. He had then been very leniently dealt with, seeing that though the penalty incurred was £20, he got off with a a fine of £5. On this occasion he should adjudge him to forfeit and pay the sum of £20 sterling of modified penalty, and in default of immediate payment thereof adjudged him to be imprisioned in the prison of Edinburgh for the period of twenty-one days, unless the said penalty should be sooner paid.

The defendant, however, paid the fine, and was released from custody.

ODONTO-CHIRURGICAL SOCIETY.

The second ordinary meeting of the Session, 1884-85 was held on December 11th, at the Rooms, 30, Chambers Street, Edinburgh; Mr. Andrew Wilson L.D.S.Edin., President, in the Chair.

The Secretary read the following communication from Mr. C. J. Boyd-Wallis, L.D.S.Eng., on

EPULIS TREATED BY ELECTROLYSIS.

Mrs. ——, æt about 50, Epulis of the upper jaw over the sites of the right second molar and wisdom teeth, which had been extracted some two years previously. The tumour began to form, with the appearance of a gum-boil, sometime before the removal of the wisdom tooth. When first under observation the saliva flowed freely, and there was a tender swelling at the angle of the jaw and down the side of the neck, with occasional stabbing pains. The general health was not good. The tumour overlaid the hard palate, but was not adherent to it; it was somewhat soft and of a livid red colour, and bled freely on puncture. This tumour was of second growth, the previous one having been removed by the knife. In consultation with my friend, Dr. M'Oscar, treatment of the tumour by Electrolysis was decided upon, and with this in view I constructed some needles of platinum wire, which were inserted into copper wire and gold soldered, then arranged in a boxwood handle, with a "make and break" arrangement for the current. Several needles were at first employed, and Electrolysis was continued at intervals for a period of about six months. But little trace the tumour was to be seen at the completion of the treatment, a small mass of indurated cicatricial tissue alone marked the spot, and this in no way interfered with the adaptation of artificial teeth.

The discussion upon Dr. Norman Kingsley's paper on "Irregularities of the Teeth," read at the November meeting, and published in the December number of the *Dental Record*, page 563, was next taken up.

The Secretary on behalf of Mr. Matthew, who was unavoidably absent, exhibited two series of models illustrating the treatment of regulating cases mainly through the agency of the frame known as Coffin's split plate. The one in which an outstanding lateral was brought into line, in an already well filled jaw, with remarkable success; and the other, where a narrow arch associated with very marked irregularities, both in the position and direction of the teeth, had been, after a year's treatment, reduced to a condition very closely bordering upon regularity—but as the patient was still under treatment, a still more favourable result might be looked for. The latter case was the occasion of considerable comment, as the difficulties in undertaking it were great, and the results very gratifying.

Mr. E. A. Cormack said—In Dr. Kingsley's paper we find the following:—"As a general statement, the finer the nervous organisation, the more precocious or brilliant the intellect, the greater will be the tendency to dental deformity; the converse is true of feeble-minded people, who, having a fair physique, will show well rounded jaws and regular dental arches—the exceptions to the latter statement are found among those cases of hopeless idiocy where the whole organisation as well as the intellect is depraved." Dr. Kingsley has long held this theory and seeks to prove it, by comparative examination of the jaws of the ancients and uncivilised moderns with those of people now living or lately dead. Regarding this argument he quotes from Messrs. Cartwright & Coleman, who examined 200 ancient skulls at Hythe Church, Kent. Messrs. Cartwright & Coleman found the dental arch in those skulls remarkable for its regularity, only two slight deviations being found, and in no single instance was there anything seen approaching the contracted arch. The average width was $2\frac{1}{2}$-in. or $2\frac{4}{8}$.

In 1869 Mr. Mummery examined 3,000 skulls of ancient races and uncivilised moderns: the average width of ancient races was a trifle less than $2\frac{3}{8}$-in., of uncivilised moderns a trifle above $2\frac{4}{8}$. Of the latter the highest average were to be found among the New Zealanders. Feejee Islanders and Ashantees $2\frac{6}{8}$; lowest average belonging to Hottentots and Bushmen, $2\frac{1}{8}$. The average width of the civilised modern arch is a trifle above $2\frac{1}{8}$-in.

Thus we see that between ancient and modern dental arches there is a slight contraction, and that, with the modern savage, the more intelligent races have a greater width than those of such degraded tribes as the Hottentots and Bushmen.

Let us glance briefly at the causes which bring about this modern contraction among our semi-human forefathers ("Descent of Man," Ch. ii., p. 53) "the free use of the arms and hands, partly the cause and partly the result of man's erect position, appears to lead in an indirect manner to other modifications of structure. The early male forefathers of man were, as previously stated, probably furnished with great canine teeth—which served them as formidable weapons—but as they gradually acquired the habit of using stones, clubs, or other weapons, for fighting with their enemies or rivals, they would use their jaws less and less. In this case, the jaws, together with the teeth, would become reduced in size, as we may feel almost certain from innumerable analogous cases."

Again ("Descent of Man," p. 1, C. ii., p. 3) "It is asserted that the hands of English labourers are at birth larger than those of the gentry. From the correlation which exists, at least, in some cases, between the development of the extremities and of the jaws, it is possible that in those classes, which do not labour much with their hands and feet, the jaws would be reduced in size from this cause. That they are generally smaller in refined and civilised men than in hardworking men or savages, is certain, but with savages, as Mr. Herbert Spencer has remarked, the greater use of the jaws in chewing coarse uncooked food would act in a direct manner on the masticatory muscles, and on the bones to which they are attached. In infants long before birth, the skins on the soles of the feet are thicker than on any other part of the body; and it can hardly be doubted that this is due to the inherited effects of pressure during a long series of generations."

Regarding mere irregularity there can be no doubt, as Kingsley says, " that the primary cause, so far as the individual is concerned, of any general disturbance in the development of the permanent teeth, showing itself particularly in their malposition—is directly traceable to a lesion or enervation of the trigeminal nerve; it is an interference more or less prolonged and operating at its origin"; but the causes for this interference are not far to seek. Whenever we have the blood supply drawn from this nerve centre, from whatever cause, we will have derangement of its functions; now there may be an undue stimulation of the brain (overpressure), or prolonged disease of any organ or portion of the body or any general nervous derangement such as infantile convulsions, epilepsy, chorea, or paralysis. With all this, however, I find it hard to discover where intelligency comes into play. I think it may be, therefore, that the contraction of the dental arch is not due so much to intellectual interference as to atrophy from the disuse of surrounding muscles. I have been unable to trace any relation between intelligence and deformed jaws, nor have I found any proof of it in Dr. Kingsley's book, unless he holds that education and intelligence are synonymous terms. Now, education has been defined as the " art of drawing out or developing the faculties of training human beings for the functions for which they are destined," whilst the intellectual powers are explained in part by their contrast with feeling and will. When we enjoy pleasure or pain we are said to feel; when we act to procure the one or avoid the other we put forth voluntary energy, when we remember, compare, or reason, our intelligence is exerted. Precocity by over nervous stimulation may bring about irregularities, but then precocity is not intelligence, and it is scarcely possible that the workings of the intellect of a child between the ages of 4 and 7 could materially effect such an interference as we have been considering. There can be little doubt that to the overpressure at primary schools we can attribute many sad effects both on the general health and on the teeth, but we must remember that those on whom this pressure is most felt are those of least intelligence.

Altogether, I have come to the conclusion that this insidious contraction of the jaws is not due so much to a psychlogical as to a physical refinement, a refinement which may be traced to the gradual desuetude of the muscles. Our ideal of the intellectual giant is not associated with contracted features, but rather with the strongly marked bony framework and the massive under jaw. Although it would not be true to say that a great intellect never dwells within a deformed body, yet it will generally be conceded that the healthier the body and the freer it is from deformities, the stronger and, in a broader sense, the more healthy will be the intellect.

Mr. Campbell agreed in the main with the views so clearly expressed in Dr. Kingsley's paper. It was of the first importance to have a clear idea of correct principles, which, when thoroughly understood, could be brought to bear upon each particular case. It would have been extremely interesting to have seen a few of the ingenious appliances made use of by Dr. Kingsley for regulating teeth. The plate used by him, and shown by Mr. Finlayson, for "jumping the bite," was quite a new idea to him ; he had recently a similar case to that now before them, the superior central incisors projecting considerably beyond the lowers. He told the young lady's mother that twenty years ago he would have taken her daughter's case in hand at once, and, no doubt, would have succeeded in bringing the teeth into a proper circle, but experience had taught him the difficulty of retaining teeth so moved in their new positions. He thought it quite possible "jumping the bite" might be the correct treatment in the case referred to. He could not help expressing surprise that Dr. Kingsley had made no reference to Dr. Coffin's split plate for expanding the arch; he (Mr. Campbell) did not know of any appliance which would compare favourably with it for simplicity and efficiency. In reference to Dr. Kingsley's remark, that "in the higher social scale it is exceptional to find a young person with a developed and regular row of teeth set in a well formed and perfectly rounded arch"—he had no doubt that Dr. Kingsley was correct in respect to the United States, but he would give as the result of his observations, that the upper classes in Scotland have, as a rule, well developed maxillæ and fairly regular teeth.

Mr. Amoore agreed with most of the remarks made by Mr. E. A. Cormack. He was certainly not of the opinion that those whom we were accustomed to look upon as owning a giant intellect were possessed of small jaws; he knew of one in which this was reported to be the case, but he could put against that a far greater number who had a jaw more resembling the square set type to which Mr. Cormack had referred. Undoubtedly healthy vigorous exercise tended very strongly towards the development of a well formed bodily frame, and if, after the acquirement of such a condition by a certain class of people, it were to be perpetuated by intermarriage, we should expect to see the jaws and teeth share in the beneficial results. The British aristocracy, as had been remarked by Mr. Campbell, had, as a rule, well developed maxillæ and good dentures, and in our own country that class approach more nearly the conditions just described than any other. Apart from Mr. Campbell's experience, he knew, from those who had good reason for their statement, that among the upper ten, where early mental training was usually associated at the public schools with abundant vigorous exercise, and where from social reasons intermarriage among members of that class was the rule, we found both well formed jaws and good teeth, and he thought that many members of the British aristocracy might fairly be taken as types of well developed humanity, both physically and intellectually.

The President said the discussion had gone a little more into the causes of dental irregularities than into their treatment. Whatever might be the case in America, he thought they would all agree with him in saying that here, overcrowding of the teeth and contraction of the jaws were not peculiar to any social class, but, pervaded all, being probably least marked in the higher classes.

In that class of cases, with which some amount of mental weakness, was by some authorities associated, they found the arch of the *upper* jaw irregularly contracted, the incisors, especially the centrals, rather prominent, and the vault of the palate high, while the arch in the lower jaw was comparatively much wider, the incisors closing decidedly within the uppers, so giving an apparently great recession of the chin. In these cases a great deal could be done, by opening out the arch, for which purpose Coffin's split plate was pre-eminently adapted. The series of models of the two cases sent by Mr. Matthew illustrated its advantages very markedly, and he much regretted that Mr. Matthew had not been present, so that they might have had his course of treatment explained in detail. In the more complicated case the curvature had been so widened and rounded that it was a little difficult to realise that the first and last were models of the same mouth. He, like Mr. Campbell, had been struck by the absence of all mention of Dr. Coffin's contrivance in Dr. Kingsley's paper, possibly it was included in the general term wedges, as used in it.

In those cases in which there had been enormous development of the cranium at the expense of the maxillæ, the lower jaw was proportionally as narrow as the upper, in many cases even more so, and, in his opinion, irregularity in this was best treated by removal of some of the teeth.

Nature seemed to be experimenting on the subject, witness the much more frequent suppressions of the lateral incisors, especially in this class of casses. He quite agreed with Dr. Kingsley's remarks as to the very persistent tendency shown by teeth which had originally projected to return to that position, more especially when the irregularity was hereditary, at the same time, he thought, there was less of that tendency when there had been some of the teeth removed.

He was much pleased that the subject had led to such a free expression of opinion among them.

At the meeting on January 8th, Andrew Wilson, L.D.S.Ed., President, in the chair, Mr. John Stirling, L.D.S.Eng., read a paper upon the

TREATMENT AND FILLING OF THE NERVE CANALS IN TEETH.

We are gradually progressing in the proper treatment of aching teeth. It is not very many years since the filling of roots was an operation we only heard mentioned, and never saw accomplished, and when it was the almost universal practice to fill teeth over a devitalised nerve, without any attempt to remove it. Co-existent with that was the now old-fashioned operation of rhizodontophry. We have not yet arrived at perfection in the treatment of roots, but we have improved very much upon that; which, I hope, will be shown in the discussion of the subject here to-night.

In the first place, I will consider the treatment of the teeth preparatory to filling their roots, and I will take the simplest and easiest of cases first—that is, devitalising and extirpating the nerves of the teeth.

In destroying a tooth pulp, when arsenic is employed, it should not be used as we get it from the chemist's shop, but should be triturated in a small mortar, moistened with water, from half-an, hour to an hour, and I prefer to use it with nothing but carbolic acid added to it. I usually leave the extirpating of the pulp till about four weeks after applying arsenic. The dressing is removed after twenty-four or forty-eight hours, and the pulp-chamber well opened into, cutting out at the same time the bulbous portion of the pulp, after which it may safely, or rather advantageously, be left alone for a month or more.

If any attempt be made to remove the nerve on the same day, or within a few days, of removing the dressing, it must in most cases cause considerable pain to the patient. At the end of four weeks the pulp should be cleared out of the canals. I use these instruments as nerve extractors. You will see they are round, and slightly barbed or roughened, with a sharp sculptor.

If, when clearing out the nerve, there is found to be still some vitality at the far end of the canals, drenching it well with carbolic acid, and careful manipulating with the nerve extractor, will get it out painlessly. Where there has been little or no putrefaction of the pulp further than extirpation of the pulp, the canals require no preparation or treatment. I very rarely open a canal with broach or drill to the apex of the root. The canals may be filled immediately after removing the nerve.

I have not had any experience in treating a devitalised nerve with tannic acid, and then extracting it entire, but if that can be done painlessly, it is to be commended. Such a tooth could be finished in two or three days from the time its treatment was commenced. In upper front teeth, after devitalising the nerve, when I put in a temporary stopping, I often, at the end of a month, remove that nerve entire with one draw of the instrument, without pain to the patient. But if there has been the slightest gangrene of the nerve, a temporary stopping is inadmissible ; the cavity must be left open.

Where I find inflammation of a nerve, caused perhaps by a stopping being too near to it, if it be at all severe, or especially if it has extended to the periosteum, I devitalise and eradicate the nerve in the manner which I have just described. I have no faith in capping such a nerve ; an accidental exposure, of course, I always cap, but any tooth pulp that has once been very decidedly inflamed, and has once given severe toothache, will never return to its normal state ; cap and stop with non-conducting material as you will, the pulp will always remain in a chronic state of inflammation. The capping may stop ordinary toothache, but the tooth

Allow me to digress for a moment, and give very briefly my experience of cocaine. I used a 20 per cent. solution of the hydrochlorate, and for lancing the gum or for extracting teeth I have found it no better than chloroform applied to the gum. The anæsthesia seems to be very superficial, but, nevertheless, decided. For excavating sensitive dentine, it is to be highly commended. For that purpose I have been using for some time the oxide of calcium, left in tooth till the following day, and have been much pleased with it; but here we have an agent superior, which permits the completion of the excavating at the first sitting.

The extraction of teeth, in order to fill the canals, and then replanting them, I cannot discuss. I never practised it, and I never agreed with it in theory.

We will now consider the cleaning and preparation *for filling of the nerve canals*, which should be done as soon as the tooth is quite free from pain. The cavity of decay should be so shaped that the canals be made easy of access. If the decay has not made it so, then it must be shaped with chisel, file and burring engine, and it is often necessary to cut away a great part of the crown of the tooth.

In large posterio-approximal cavities of second bicuspids, and all the molars, the cavity should be opened up to nearly the middle of the crown, making it resemble a compound one. Most of this would be done with the chisel and finished with the file, putting it between the teeth and holding it while filing at an obtuse angle. That is, making something like a broad wedge-shaped opening between the teeth. This lower molar shows the shape of cavity I am describing. With *small* posterio-approximal cavities it is often better to open through the crown of the tooth. Sometimes, in first molars, and very often in bicuspids, we can get sufficiently good access to the cavity and canals by cutting away the posterio-buccal surface of the tooth, as is shown in this upper molar. But where we have to fill canals with the aid of the mouth mirror, it is usually better to cut both buccal and lingual sides. Having enlarged the cavity of decay, we then open up the pulp chamber with burring engine and excavator, and then enlarge the orifices of the canals, making a kind of trumpet-mouth shape to each of them. In molar teeth, with a buccal cavity small and near the gum, the only thing we can do is to make a crown cavity with the burring engine, as shown in this lower molar. With a drill such as I now exhibit, I make two, three or four holes through the crown to the pulp chamber, and then open up with a burr head, usually a long burr drill. I consider a case like this a difficult one, and if the patient were over middle age I might hesitate to attempt the treatment of it, but in young teeth it can be successfully accomplished.

You have heard the saying, "keep your powder dry." The equivalent of that to us should be "keep your instruments sharp and well tempered." I am certain there are cases of failure when there need not be, because that is not attended to. To clean the canals, I usually begin with bicarbonate of soda. I fill the cavity of decay with it, add one drop of water from a syringe, and with one of these canal needles, slightly roughened, work it up and down and against the sides of the canals, then syringe out with warm water. If the canals are very foul, I do that twice or more. I then put one crystal of permanganate of potassium in the cavity of decay, add one drop of water, and work it into the canals as I did the soda, then syringe well out. Care must be taken not to force any of it through the apical foramen, because if any go through it will give pain, lasting sometimes two or three hours. I then fill the canals with carbolic acid, forcing it well to the very ends in the manner which I will now describe. Saturate well with corbolic acid a small pellet of cotton wool, put it into the cavity of decay, pass a *smooth* needle by the side of the wool into the canal and work it up and down. The needle, if it is of a proper thickness, acts as a piston, and the liquid can be forced to the very ends of the canals. I usually begin with a thick needle and finish with one fine enough to force the liquid to the very end, and if a little go through the foramen so much the better. When applying it to the roots of front teeth where the crown has been lost by decay, or has been cut off preparatory to inserting artificial teeth, having no cavity to hold the cotton wool, I wrap a very slight shred of wool or floss silk round a slightly roughened needle, and keep dipping it in the acid and forcing it in the canal till it is filled. Having cleaned the canals, and applied carbolic acid, that is enough for the second visit. At the third visit, if the canals are clean and the tooth seems well, I use bicarbonate of soda and carbolic acid as before, and then fill the root and the tooth. Permanganate of potassium should not be used at the last visit, because it discolours the tooth, and if there is still any odour from

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We will now consider the cleaning and preparation *for filling of the nerve canals*, which should be done as soon as the tooth is quite free from pain. The cavity of decay should be so shaped that the canals be made easy of access. If the decay has not made it so, then it must be shaped with chisel, file and burring engine, and it is often necessary to cut away a great part of the crown of the tooth.

In large posterio-approximal cavities of second bicuspids, and all the molars, the cavity should be opened up to nearly the middle of the crown, making it resemble a compound one. Most of this would be done with the chisel and finished with the file, putting it between the teeth and holding it while filing at an obtuse angle. That is, making something like a broad wedge-shaped opening between the teeth. This lower molar shows the shape of cavity I am describing. With *small* posterio-approximal cavities it is often better to open through the crown of the tooth. Sometimes, in first molars, and very often in bicuspids, we can get sufficiently good access to the cavity and canals by cutting away the posterio-buccal surface of the tooth, as is shown in this upper molar. But where we have to fill canals with the aid of the mouth mirror, it is usually better to cut both buccal and lingual sides. Having enlarged the cavity of decay, we then open up the pulp chamber with burring engine and excavator, and then enlarge the orifices of the canals, making a kind of trumpet-mouth shape to each of them. In molar teeth, with a buccal cavity small and near the gum, the only thing we can do is to make a crown cavity with the burring engine, as shown in this lower molar. With a drill such as I now exhibit, I make two, three or four holes through the crown to the pulp chamber, and then open up with a burr head, usually a long burr drill. I consider a case like this a difficult one, and if the patient were over middle age I might hesitate to attempt the treatment of it, but in young teeth it can be successfully accomplished.

You have heard the saying, "keep your powder dry." The equivalent of that to us should be "keep your instruments sharp and well tempered." I am certain there are cases of failure when there need not be, because that is not attended to. To clean the canals, I usually begin with bicarbonate of soda. I fill the cavity of decay with it, add one drop of water from a syringe, and with one of these canal needles, slightly roughened, work it up and down and against the sides of the canals, then syringe out with warm water. If the canals are very foul, I do that twice or more. I then put one crystal of permanganate of potassium in the cavity of decay, add one drop of water, and work it into the canals as I did the soda, then syringe well out. Care must be taken not to force any of it through the apical foramen, because if any go through it will give pain, lasting sometimes two or three hours. I then fill the canals with carbolic acid, forcing it well to the very ends in the manner which I will now describe. Saturate well with corbolic acid a small pellet of cotton wool, put it into the cavity of decay, pass a *smooth* needle by the side of the wool into the canal and work it up and down. The needle, if it is of a proper thickness, acts as a piston, and the liquid can be forced to the very ends of the canals. I usually begin with a thick needle and finish with one fine enough to force the liquid to the very end, and if a little go through the foramen so much the better. When applying it to the roots of front teeth where the crown has been lost by decay, or has been cut off preparatory to inserting artificial teeth, having no cavity to hold the cotton wool, I wrap a very slight shred of wool or floss silk round a slightly roughened needle, and keep dipping it in the acid and forcing it in the canal till it is filled. Having cleaned the canals, and applied carbolic acid, that is enough for the second visit. At the third visit, if the canals are clean and the tooth seems well, I use bicarbonate of soda and carbolic acid as before, and then fill the root and the tooth. Permanganate of potassium should not be used at the last visit, because it discolours the tooth, and if there is still any odour from the tooth it should not be filled, but should be treated with soda and the permanganate as before, finally filling the canals with soda and closing up with wax or cotton wool, with instructions to the patient to remove the wool if the tooth should ache. My usual mode of testing the cleanness of a canal is to pass one of these needles into it, then withdraw the needle and smell it. Whether the putrid matter enters the dentinal tubules to any great extent I do not know, but occasionally we find a tooth so permeated with this foul odour that it requires more time to purify it, and it is sometimes at a fourth or even a fifth visit that I fill such a tooth, and as long as there is the slightest trace of pus in the canals, or fistulous opening on the gum, or gumboil, the treatment should be continued with soda and carbolic acid, using the latter very freely. Sometimes about one-third of a nerve remains alive at the end of a root, very tenacious of its vitality, and requiring patience to overcome it, but persistent acupuncture with carbolic acid will do it. I have not yet tried cocaine for this purpose, but would hope for good results from it.

We hear of some operators drilling through gum and bone, and scraping off a pus-forming sac from the end of a root, but such treatment seems to me a little too heroic and unnecessary. Excepting in aged teeth, carbolic acid can usually be forced through the apical foramen, and I feel assured that when persistently applied, a very small quantity at a time of the liquid, full strength, is enough to destroy the sac, or it brings it into a state of quiescence. When it is possible, the foramen should be slightly enlarged where there is a persistent discharge of pus. The treatment, to be quite successful, should be continuous, and when we have a patient who does not come at the appointed times, or comes only when the tooth has begun to ache again, it is better to advise the extraction of the tooth. I have got myself into disgrace by attempting to treat such a tooth for such a patient.

I fill roots always with oxychloride of zinc and nothing else, and I do not intend to discuss the use of any other material for that purpose. Suffice it to say that some years ago I used cotton wool, gutta percha, gold, amalgam, &c., but I have been most successful with oxychloride of zinc. The best oxychloride I have found for the purpose is Guillois' cement, because it is slow setting. The method of filling is to mix it a very little thicker than cream, put it in the cavity of decay, introduce a thick needle into the canal, and pump the oxychloride as far as the thick needle will carry it, then use a thin needle to carry it to the end of the canal. It should be well and freely forced to the very end, and as soon as it *begins* to set it should be left alone till hard. Then scrape the oxychloride out of the cavity of the tooth, and fill with whatever material is most suitable for it. In filling roots where the whole of the crown is gone, I fill two thirds wlth oxychloride and the remaining third with amalgam. In filling the canals of posterio-approximal cavities in molars, where it has to be done with the mouth mirror, if more time is wanted in working the oxychloride, it can be gained by adding about 20 per cent. of water to the liquid, which makes it set slower.

It has been said that, in filling canals with oxychloride of zinc, we should be careful not to force it through the foramina, but there can be no fear of harm from that when we do not enlarge them. They are so small that very little can go through, even though there were a vacuum in the socket to receive it, which there is not. Besides, it is a liquid we are using, and not a solid substance, which might be forced into the socket with pressure. Further, I maintain that a little forced through—if it be only a little—it will do no harm beyond giving slight pain for half-an-hour or an hour.

Dr. Marshall Webb has said (" Notes on Operative Dentistry, 1883 ") we should enlarge the canal, when possible, up to the foramen, and then, before filling with oxychloride of zinc, close the foramen with gold foil. It seems to me that in doing so we would run a risk of having the gold foil pressed either too far or not far enough, either of which two conditions would be dangerous to the success of the operation.

Dr. J. Foster Flagg says (" Dental Pathology and Therapeutics, 1873 ") that if one-third of a root be left unfilled, sooner or later it will give trouble. I think that is true of some roots only. I would not like to leave an upper incisor root only two-thirds filled, but I have done so often with the buccal roots of upper molars, and I know that many of these teeth have been all right for several years.

I think it is not good practice to fill roots with cotton-wool and creosote, or carbolic acid. I remember three cases of periostitis, quite lately, where I found, on removing the stopping, the canals filled with cotton, and smelling strongly of creosote as if newly put in. Although the roots in these cases were apparently clean, trouble had been set up, from a few weeks to a few months after filling.

I will give you here, in their order, cavities of decay in teeth, which I find easy or difficult of access to the canals, beginning with the easiest :—

Upper front teeth—approximal and lingual cavities.
Upper and lower bicuspids and lower canines—approximal and crown cavities.
Upper front teeth—labial cavities.
Lower incisors—approximal cavities.
Upper molars—crown and antero-approximal cavities.
Lower molars— do.
Upper molars—posterio-approximal cavities.
Lower molars— do.
Upper and lower molars—buccal and lingual cavities.

One word about temporary teeth. The difficulty in treating the roots of temporary teeth consists only in the age of the patient. The same teeth in the mouth of an adult could be easily treated. Appointments are also more likely to be neglected—very often after the first visit—when toothache has been relieved, we see no more of the patient till toothache has returned, and the tooth probably in a much worse state than before. Thickening of the membrane and congestion at the root seems to come on sooner than with permanent teeth, probably because the foramina are often wide.

I only attempt to treat those in which the canals are easy of access. We can hardly do more for a patient so young, and usually restless, and little value is generally put on a tooth which is to fall out in a short time. When time for shedding arrives, absorption of the root does not take place as when in the normal state, and it is well to caution the patient's friends of that. If permanganate of potassium be used, it should be done with great care.

We cannot be successful in every case. I reckon my failures at about 10 or 15 per cent., and here is one that occurred to me three weeks ago. It is a lower bicuspid, with two distinct canals, and the lingual one, as will be seen, is filled to fully two-thirds of its length with secondary dentine, which was probably the cause of the failure.

Secondary dentine, and pulp stones, especially the former, are sometimes a formidable barrier to the opening of a nerve canal.

Excepting in straight roots, easily got at with a drill, when a canal is filled to nearly a half of its length with secondary dentine, nothing can be done, and we have only to hope it will not cause any trouble.

The President, after thanking Mr. Stirling for his very interesting and practical paper, said that, according to their usual custom, the discussion would form part of the business of their next meeting.

THE ODONTOLOGICAL SOCIETY.

THE Annual General Meeting of this Society was held at 40, Leicester Square, on Monday evening, January 12th, Mr. J. Smith Turner, President, in the chair.

The President called upon the Treasurer, Mr. James Parkinson, to read his report for the year, which showed a balance in hand of £140 5s. 7d., the receipts for the year having been £603 1s. 10d., and the expenditure £462 16s. 3d. The large balance in hand was due in a great measure to the payment of arrears of subscriptions.

The total number of new members elected during the year was seven—namely, one resident and six non-resident. Resignations, six; deaths, three; and members erased for non-payment of subscriptions, three. The total number of members of the Society being 361; consisting of 122 resident, 196 non-resident, and 43 honorary.

Mr. Felix Weiss, the Librarian, read his report, which showed that 42 members and 65 students had used books from the library. Several additions had been made during the year—namely, twelve English, three American, seven French, and one German.

Mr. Hutchinson, the Curator of the Museum, reported that since the issue of the catalogue in 1882, 125 specimens had been received.

The following members were elected as officers and councillors for the year 1885:—

President—C. Spence Bate, F.R.S. (Plymouth).

Vice-Presidents—(Resident)—T. Charters White; George Gregson; Henry Sewill. (Non-resident) — J. T. Browne-Mason (Exeter); Richard White (Norwich); Andrew Wilson (Edinburgh).

Treasurer—James Parkinson.

Librarian—Felix Weiss.

Curator—S. J. Hutchinson.

Editor of the Transactions—J. Oakley Coles.

Honorary Secretaries—David Hepburn (Council); Robert Woodhouse (Society); Storer Bennett (for Foreign Correspondence).

Councillors—(Resident)—F. Canton; Alex. Cartwright; Chas. S. Tomes; Wm. St. George Elliott; Augustus Winterbottom; Samuel Cartwright; A. Morton Smale; J. Howard Mummery; Arthur S. Underwood. (Non-resident)—J. F. Cole (Ipswich); G. C. McAdam (Hereford); W. E. Harding (Shrewsbury); Robert Reid (Edinburgh); J. R. Brownlie (Glasgow); J. H. Whatford (Eastbourne).

Mr. Oakley Coles exhibited appliances which the natives of the Congo used for cleaning their teeth. He also showed an improved form of operating stool, which had the advantage of being able to be raised without the operator getting off, and put at any angle without the trouble of touching a lever.

Mr. S. Bennett exhibited a specimen of a gorilla's skull, which showed absorption of the alveolus and other serious injuries received during its lifetime.

The Secretary read a communication from Dr. E. A. Bogue, of New York, on the subject of separating teeth, and also exhibited that gentleman's improved pattern of instruments designed for that purpose, which could, by means of a small screw, so bear upon the teeth as to cause them to separate with very little pain to the patient.

The following is an abstract of a paper read by Mr. Storer Bennett, F.R.C.S., L.R.C.P., L.D.S.Eng.,

ON HERBST'S METHOD OF GOLD-FILLING BY ROTATING BURNISHERS.

During the process of filling by this method, it is necessary to have four walls to the cavity, and where these do not exist already they are temporarily supplied by means of a matrix. Large soft cylinders are employed, and packed into the cavity unannealed, becoming cohesive during the course of manipulation. And herein lies the greatest peculiarity of the process; for by other methods we introduce into the cavity gold which is already cohesive, but here we introduce soft cylinders which when pressed together show no tendency whatever to cohere, yet, in the course of a few revolutions of the burnisher, become coherent and welded into a solid mass, like a piece of cast metal.

The instruments employed consist of various sized and shaped burnishers, worked by the burring engine.

They are numbered from 1 to 15. No 1 is a large inverted cone; 2, 3 and 4 are large pear-shaped points, all highly polished. No. 5 is ground to a blunt (" roof-form ") point, but this must not be polished, but simply finished on an Arkansas stone; as this instrument is much employed, two or three sizes of it are desirable. The remaining instruments, from 6 to 14 inclusive, are polishers used in finishing fillings. No. 15 is a needle for a special purpose to be described hereafter.

A cavity is prepared in the usual way, care being taken that its interior is larger than its entrance; undercuts may be made if convenient, but are not essential, and no retaining points are required; the edges of the enamel, though smoothed and polished, should not be bevelled, but left quite square.

In filling a cavity, take for instance the distal surface of a second upper bicuspid, with the masticating surface also involved. Such a cavity by the ordinary method would be filled cohesively from the beginning, and built up in order to reproduce the contour. By the addition of a matrix the distal wall is restored, and we have now to treat a simple crown cavity. This matrix (which is best formed of a piece of clock spring deeper than the cavity) is wedged between the bicuspid and first molar, if that is standing, and secured by two pins, jamming it as tightly as possible. It is essential that the maxtrix be perfectly firm and steady, or the filling will be unsound.

The tooth being prepared, the rubber-dam applied, and the matrix in position, the cavity is loosely filled with the largest cylinders that can be conveniently introduced, and the largest burnisher selected that the mouth of the cavity will admit. By slow rotations of this instrument in the engine, and the exercise of moderately firm and steady pressure, the gold is squeezed towards the floor and sides of the cavity, acquiring as it is compressed a brightly polished non-cohesive surface. If it is found that the gold rolls beneath the burnisher, it is because too few cylinders have been introduced, and more must be added, or because too small a burnisher is being employed. If sufficient gold is placed in the cavity, and a large burnisher used, the gold will not roll, and it is of course essential that this, the base on to which all the subsequent filling is built, should be absolutely steady and immovable.

The burnisher is now changed, and a No. 5 point, not too small in size, and which it will be remembered is left unpolished, is substituted. This is very rapidly rotated with moderate pressure, and the gold *prodded* by it, if I may be permitted the expression, as it exactly conveys my meaning. The whole of the filling must be gone over in this manner, especial care being taken that the gold is thoroughly driven down to the cervical edge towards the matrix, for here if anywhere will be the weak place when the filling is complete.

The rapid rotation causes the gold to be still more condensed than it was at first, to lose its polish, and become converted into a hard and solid mass of cohesive gold.

The cavity must again be loosely filled with cylinders, and these treated in a similar manner to the former ones, first the large burnisher being used, and then the No. 5, and so on with more and more cylinders until the cavity is quite full, when the matrix may be removed, and the filling smoothed and polished in the usual manner, where necessary.

But little finishing, however, will be required if the matrix has been adapted closely to the cervical and lateral margins of the cavity, and in this way much time and trouble are saved.

During the process of filling it will be noticed that the burnishers become coated with gold, which may be cleaned off by rotating on a piece of emery paper, the large ones on very fine, and the No. 5 on somewhat coarse paper; or, better still, they may be cleaned by being pressed while rotating on a block of pure tin. A little of the tin is apt to be conveyed to the filling, but it does not appear to affect either its working quality or its colour.

Care must be taken that the instruments be not kept too long in contact with the gold, or the filling will soon become very hot and painful to the patient.

Occasionally, if the pressure be retained too long, the gold acquires a highly polished surface, which cannot be made cohesive in the ordinary way; this may be overcome by rapidly rotating on it a fine cut burr such as is used for dressing down fillings; this tears up the polished surface, and leaves a perfectly cohesive one in its place ; the filling may then be proceeded with in the ordinary manner.

It is in all cases desirable that the matrix should extend well beyond the margins of the cavity, both towards the cervical edge and the grinding surface. If it does not extend beyond the grinding surface it will be found a very slow and difficult process to apply the last layers of gold, but not so if the matrix is made sufficiently deep.

When a corner of a tooth, as for instance an upper incisor, is to be restored, a somewhat different method must be adopted for applying a matrix. Here, however, the same general principles for filling will be observed, viz., the cavity must be smaller at its entrance than its interior, and four walls must be provided, since they do not exist already.

These artificial and temporary walls may be formed by embedding the tooth and two or three adjoining it in softened shellac brought well over the cutting edges of the teeth and between them, so as to afford as much support as possible. Should any shellac have oozed into the cavity it may be removed when cold by the aid of an excavator. When it is possible, however, it is eminently desirable that the walls should be formed of metal, such as clock spring or platinum foil, which can be moulded to the shape of the tooth in the form of a collar, and soldered or not, as may best suit the case, being subsequently imbedded in the shellac. The metal gives an increased support, and prevents the heat which is apt to be generated in working softening the shellac and causing the gold to sink into it and become spongy and porous. Should this happen, it will be found that portion of the gold comes away from the filling and attached to the shellac when the matrix is removed.

When two interstitial cavities in front teeth are to be filled, they are separated sufficiently to allow a thin dividing file to pass between them, no more room being necessary ; they are excavated and as good a hold obtained in each as required, then a few cylinders are packed in one cavity and condensed, &c., as previously described, the process being repeated in the other tooth, more gold is added, until finally the two cavities are united, one filling stretching across and occupying both teeth.

When the cavities are quite full, the point of instrument No. 15, which is a clean smooth sewing needle set in a socket, is placed on the gold in the interval between the two teeth, and by slow rotation and steady pressure passed right through the gold, first near the gum, then near the cutting edge, then between the two; more holes are now drilled if necessary, and finally they are joined by means of a saw or fine file. The two fillings are now finished in the usual manner.

In using the needle, care must be taken that it is passed backwards exactly in the right direction, or it is apt to be driven into one of the cavities instead of between them. These needles are readily renewed when broken, as they are merely fastened into the socket of the holder by shellac or soft solder.

It will be noticed by this method of filling that soft, unannealed, non-cohesive cylinders are introduced into the cavity, and by subsequent working are converted into a mass of cohesive gold. This effects an immense saving of time, as we are thereby enabled to use large cylinders and several at once; for being soft they are readily adapted to the walls and floor of the cavity, whereas by our ordinary method we can only use small pieces of gold, and one piece at a time; if we attempt to pack a large cylinder which has been annealed we find it becomes hard on the exterior and spongy within. The difference being that one is heated before any attempt is made to adapt it to the walls of the cavity, and the other becomes cohesive only subsequently to the adaptation having been produced.

This adaptation of the gold to the walls of a cavity is very perfect, as will be noticed when a tooth is split open, for every little hollow and depression will be found perfectly reproduced; the centrifugal force of the rotating burnisher having driven the gold before it into every hollow and crevice presented to it; and the component cylinders are not mechanically pressed together, but actually welded into a homogeneous mass.

Dr. Herbst invariably employs cylinders prepared by a German manufacturer, Carl Wolrab, of Bremen, which seem admirably adapted to this kind of work, and I believe much of our success will depend on their employment; no other gold I have met with appears to possess such a softnees and adaptability as this, though the soft cylinders sold by some of our makers also work extremely well.

Should a filling become damp before it is completed, it may be dried as far as possible by the ordinary means, and if a burnisher to which some gold is allowed still to cling is rapidly rotated over its surface for a short time, sufficient heat is generated to perfectly dry it and enable one to proceed with the filling to its completion.

Tin-foil may be worked in a similar manner to gold ; from its natural softness it easily adapts itself to the walls of the cavity, and readily coheres when a burnisher is rotated against it ; when beaten on an anvil it may, like gold, be flattened without splitting, showing how intimate is the union between its component portions. From the ease with which it packs, it is more rapidly worked than gold.

Gold is readily built on to tin ; a filling may thus be partly built up with tin and completed with gold in such parts as are subject to the greatest amount of wear.

To summarize my remarks, I would say, that by this method we possess a very rapid, and I hope realiable, method of filling those somewhat difficult cavities in teeth where one or more of the walls being absent we are compelled to resort to cohesive filling for restoration of the missing portion.

The method is easy when one is accustomed to it, the most troublesome part being the accurate adaptation of a satisfactory matrix, though this and other difficulties rapidly disappear after a little practice.

Too much attention cannot be paid to the matrix extending well beyond the margins of the cavity.

Great care is necessary that the gold be well compressed towards the cervical edge where it and the matrix join, for this is the most critical part of the whole filling.

Should the gold rock, it is due to too few cylinders being in the cavity, or too small a burnisher being used to start with ; probably the former is the fault.

Though the cylinders are soft and non-cohesive, they must not be annealed.

When possible, a layer of metal should always intervene between the gold and shellac matrix.

Should the gold remain polished and refuse to become cohesive, a fine cut burr rapidly rotated over it will immediately convert the surface into a cohesive one.

DISCUSSION.

Mr. Vasey asked if Mr. Bennett could explain how the non-cohesive foil became cohesive during this process ? Was it due to the heat evolved by the friction of the burnisher ?

Mr. Oakley Coles said that about six or seven years ago he tried some experiments in packing cohesive gold by means of the engine; but his idea had been to consolidate the gold by means of a revolving instrument giving a rapid succession of blows. For this purpose he had used a burnisher with rounded interrupted facets, somewhat resembling a tomato, and with this he was able, out of the mouth, to get very good solid fillings. There could, however, be no doubt that the cohesive quality of gold could be very quickly evolved by the heat generated by the rapid rotation of a perfectly smooth instrument, though he had not thought of this when he made his experiments. He considered that the profession was greatly indebted to Dr. Herbst for calling attention to this fact, and that the Society was much indebted to Mr. Bennett for bringing Dr. Herbst's discovery so clearly before it. The cohesive property of gold under certain conditions was, of course, no recent discovery; it had been known for thousands of years. But this mode of evolving it, and of securing condensation at the same time, was a novel application of known principles for which Dr. Herbst deserved all the credit.

Mr. Hutchinson thought Mr. Bennett's paper very clear and practical, but a still clearer idea of the process would be obtained if at the close of the meeting he would have an engine brought in and give a short demonstration of the principal points. Thus he had said that when the cylinders were first introduced, the engine was to be worked "slowly." How slowly? And afterwards that the point of the instrument was to be alternately applied to the gold and then removed, and that it must not be kept in contact too long. All these points could be shown in one minute by practical demonstration, whilst the mere verbal description of them did not convey a sufficiently definite idea.

Mr. Bennett had said that the most troublesome part of the process was the application of the matrix. He (Mr. Hutchinson) had been using a very simple matrix, which he believed to be a very decided improvement on the clock-spring, which had to be kept in place by wedges. It was made by breaking a small penknife blade with a thick back—a very common one would do—into short lengths. This formed a very perfect matrix, and its wedge-like shape made it very easy to fix in position, as it adapted itself well to the cervical edge; it could be easily bent if heated. It occurred to him, also, that a very simple and ingenious contrivance shown by Mr. Brunton at the meeting of the British Dental Association at Plymouth two years ago would be an improvement on the shellac matrix described by Mr. Bennett. Mr. Brunton's arrangement consisted of a short piece of clock-spring, with the temper taken out of the ends, which were sharply bent on themselves; to these a rubber-dam clamp was attached, and a very efficient and readily applied matrix was thus made when a molar had to be built up.

Mr. Walter Coffin remarked that the great interest which this process had aroused in the United States might be taken as evidence of its practical value. Dr. Herbst's discovery that soft gold might be rendered cohesive by means of a rotating burnisher was a remarkable one. The value of lining a cavity with soft gold had long been appreciated by the best operators, and the difficulty hitherto experienced in attaching cohesive gold, in order to finish with hard contour work, would appear to be greatly lessened by this very important observation.

He doubted, however, whether the first layers of soft gold, if applied with the rotating burnisher, would not be rendered less plastic and adaptable to the walls in proportion as it became hard and cohesive under its action. He would therefore like to ask Mr. Bennett whether he did not think that the first layers of gold would be best applied by hand in the usual way?

Mr. West remarked that, so far as he had heard, this method appeared to be only applicable to easily accessible cavities. He should be glad to know if it could be applied in the case of a cavity requiring a right-angle attachment; such for instance as a buccal cavity in a lower molar?

Dr. Cunningham (Cambridge) said the subject they were discussing was a most interesting one. It appeared to him that Dr. Herbst's discovery was likely to exercise a most important influence on future practice. There were, however, some points which he should be glad to see made clearer. In the first place it seemed curious that only the Bremen gold should give good results. Then he should like to hear a scientific explanation of the statement, that the non-cohesive gold was made cohesive by the action of the revolving burnisher. He could not help feeling some doubts as to whether the gold did become cohesive in the sense in which that term was generally understood. No doubt the added gold could be made to adhere to that which had been previously introduced, but there was a difference between adhesion and cohesion. What made him feel more doubtful on this point was the statement in the paper that in certain cases where adhesion could not be obtained, rough-cutting the surface with a bur would make the fresh gold stick. Very likely it did; but this was not what was usually meant when people spoke of gold being made cohesive.

Then it was said that Dr. Herbst had been at work on this system for six years, and he brought forward clock-spring as the best form of matrix which he could suggest. It appeared to him (Dr. Cunningham) that Dr. Herbst was rather behind the times. With regard, however, to Mr. Brunton's clamp, referred to by Mr. Hutchinson, it was unfortunately only applicable in certain cases. He (Dr. Cunningham) would suggest that a good matrix might be made by rolling platinum foil round the tooth, and securing it with a rubber-dam clamp. Possibly also some of the modelling compositions, such as the A1 impression material, might do instead of shellac. He thought that Mr. Bennett might have subjected his fillings to some better test than merely beating them out on an anvil. It would be interesting, for instance, to compare the specific gravity of one of Dr. Herbst's fillings with that of one made by other methods. Had Mr. Bennett tried the Bremen gold in the ordinary mode of working?

The President said he feared the most important points in the paper were being lost sight of; the precise form of the matrix was not an essential part of Dr. Herbst's method. He hoped that, as the time which could be allotted to the discussion was short, members would confine themselves as much as possible to the subject of the paper, viz., the advantages or disadvantages of filling teeth with soft gold with the aid of rotating points.

Mr. F. J. Bennett said he quite agreed with what the President had just said; the exact form and material of the matrix was quite a secondary matter. He thought a good deal of what had been said was not very much to the point. Dr. Cunningham had talked about the gold being made to adhere but not to cohere. He (Mr. Bennett) had always understood that the only distinction between adhesion and cohesion was that the latter meant the union of similar bodies, and the former the union of dissimilar; therefore when gold was joined to gold that was cohesion. Mr. Storer Bennett had, he considered, put the subject before them in a very practical form, and the best thing members could do was to go home and try it for themselves.

Mr. Herne said he happened to be present when Dr. Herbst's brother gave the demonstration at the Dental Hospital referred to by Mr. Bennett, and he could not say that the results were altogether satisfactory. He noticed that the operator used unannealed cylinders for the deeper part of the cavity, but filled the last third with cohesive gold. He had since made a few experiments himself, and he found that there was no doubt about the fact that the gold did become thoroughly cohesive as the result of this process. But whatever might be the advantages of this method, its range of adaptability was limited, since it could only be applied to fairly accessible cavities. At all events there was very great difficulty in applying it to cavities which were out of sight, and in using right-angle attachments. It was most useful in cases where the walls of the cavity were frail; it was a great advantage in such cases to avoid blows, and better adaptation of the gold to the walls could be obtained in this way with less pressure. The gain of time appeared to him to be less clear; he thought he could fill a crown filling by hand quite as quickly as with the rotating burnishers. Had Mr. Bennett found that it made any difference which way the instrument was rotated —*i.e.*, from the enamel to the gold, or from the gold to the enamel?

Mr. Betts said that he had only a few days before received a letter from Mr. Chas. Tomes, in which he referred to various matters of professional interest which he had met with during his visit to the States. With reference to the subject under discussion, he wrote: "About the Herbst method I feel less sure. It easily makes water.tight plugs, and so far is very good, but whether it is better or more rapid than other methods I feel less certain."

The President said it appeared to him that a good deal of the criticism he had heard during the discussion was founded on theory rather than practice. But it was evident that Mr. Bennett had done a large amount of work, and had investigated the matter practically. All new methods presented difficulties, and no doubt the Herbst method was no exception. But Mr. Bennett had shown that these difficulties could be overcome, and he thought that so far as the discussion had gone his verdict would be in favour of the practical success of which the specimens before him were evidence, and against the theoretical objections. He must now ask Mr. Bennett to reply.

Mr. Bennett said his object had been to learn the views of the members with regard to this new method, and in this he had been fairly successful. In reply to Mr. Vasey's question, his opinion was that the gold was rendered cohesive by the heat which was developed during the process of condensing it. The gold certainly did become hot, and if the operator was not careful the tooth might become so hot as to be unbearable and the instrument too hot to be touched. With reference to what had been said about the matrices, he admitted that this was the least developed part of the process; still they answered their purpose sufficiently well, except the shellac matrix, which was certainly not satisfactory; lining it with metal was a decided improvement. In reply to Mr. Coffin's suggestion, that it would be better to line the cavity with soft gold and condense this by hand, after the manner of the best operators, he could only reply that very perfect adaptation of the gold to the walls of the cavity *was* obtained by the Herbst method, as Mr. Coffin might satisfy himself by an examination of some of the specimens exhibited, and that this close adaptation was *not* destroyed by rendering the gold cohesive afterwards. Dr. Bödecker advised that the *last* layers should be made of cohesive gold condensed with the mallet, but Dr. Herbst was in the habit of using soft gold throughout, and all his (Mr. Bennett's) work had been done in this way.

The answer to Mr. West's question was that right-angle attachments could be used. With regard to Mr. Cunningham's remarks, he (Mr. Bennett) had used English gold as well as German, and had found that Jamieson's answered very well, though it was not quite as good, for this purpose, as Wolrab's. As to the distinctions between adhesion and cohesion, he could only repeat that gold did cohere after using the smooth-cut bur, though it would not do so before. The A 1 impression composition, suggested by Mr. Cunningham for forming matrices would, he thought, be too soft for use in this process.

He did not intend to imply that beating the filling out on an anvil was a conclusive test, still it was of some value. He might mention, as evidence of durability, that Dr. Herbst's brother had some large gold fillings in his mouth which had been inserted by this method two years before, and they showed no signs of wear.

Dr. Bödecker had tested the specific gravity of fillings inserted by this method and with the mallet, and that of the malleted plugs was the higher. Wolrab's gold worked very well when used in the ordinary way. He thought Mr. Hern would find, when he had had more practice at this method of filling, that a decided saving of time was effected by it. He admitted that it might be better to use the ordinary method of filling for inaccessible cavities. He had not found that the direction in which the instrument was rotated made any difference.

President's Address.

Gentlemen,—A voluntary office of honour may be coveted and longed for, and it may be accepted with alacrity and self-confidence or with much misgiving and apprehension on the part of the officer ; still, in whatever mood it may be accepted, the acceptance is always a voluntary act. Not so its resignation. The period arrives when time gently taps the greatest and the best on the shoulder and bids him move on—and move on he must ; for by that gentle tap the fastenings of the robes of office are loosened, the badge of power and distinction passes on to another, and the recently distinguished individual steps down from his exalted position and becomes even as other men are.

Gentlemen, without consulting my wishes in any way, time has tapped me on the shoulder to-night, and I resign to you the trust which you confided to me twelve months ago.

You have elected my successor, and I must congratulate you on having bestowed your suffrages on a gentleman who will prove an honour to his high office, and whose scientific ability and reputation are only second to the deep and practical interest he takes in the progress of his profession. Under the Presidency of Mr. C. Spence Bate, F.R.S., I think that we may anticipate a session of more than usual interest.

You have heard the reports of our office-bearers. Our Librarian has, I think, brought our fine collection of books into a state of order and accessibility such as should please the most irritable scientific book-worm. Not content with that, however, he has, in addition to other collateral matters, been able, by determined energy and perseverance, and despite the ingenious perversity and carelessness of members, to bring our members' list into as perfect and correct a form as the mutability of human affairs will permit.

Our Curator, with his able assistants, has maintained for our museum the high character for order and classification which he has stamped upon it since his advent to office. The Council has responded liberally, and I think wisely, to the calls which have been made upon the funds of the Society for the improvement of our valuable and, speaking as a Dentist, I may say unique collection. Hitherto we have only possessed the cast of the skull of a gorilla; now, however, we have a veritable skull, not only interesting in an anatomical sense, but presenting some pathological features in the teeth, of special interest to us; besides this we have the hyoid bone and over a hundred other bones of the adult gorilla skeleton. These will all be mounted, and beside them will be placed their human homologues, forming a most instructive study in comparative anatomy.

Passing onward and upward by the natural law of evolution, I think I may again venture to congratulate the Society on the acquisition of the excellent portrait of our esteemed ex-President, John Tomes, F.R.S. Notwithstanding the heavy expenses which have had to be met this year, our Treasurer has been able to report a substantial balance in our favour. The Editor of the Transactions reports himself to you once a month during our session in a way which I hope satisfies you all. I venture in the name of the Society to thank these gentlemen for their self-imposed labours so cheerfully given, as also our three invaluable Secretaries. If ever the adage that " one volunteer is worth two pressed men " requires verification, the office-bearers of this Society may be taken as a good criterion. Last, but not least, would I thank Dr. Langmore for the unostentatious but effectual manner in which he applies his literary skill to the assistance of the Editor of our Transactions.

And now, gentlemen, our pæan is done. The loud timbrel has been sounded, the tabour has been beaten, and now we must take up our harp amongst the willows, for Death has been busy in our ranks. We have to mourn the loss of Mr. A. Rogers, of Cambridge; Mr. W. J. Doherty, of Dublin; Mr. J. D. Grant, of Jersey; and on Saturday last it was my sad duty as your representative to follow to the grave the remains of one of our ex-Presidents, John Rigden Mummery. It seems but yesterday when he was an active member of our Society, and a constant attendant at our meetings. He was a frequent contributor to our Transactions, and his reputation as an Ethnologist had passed far beyond the limited circle of this Society. He was ever on the watch to bring his favourite study to bear on questions connected with his own speciality, and the volumes of our Transactions are enriched by the records of his observations on the teeth of different races, and the influence which their modes of life and the character and preparation of their foods may have had on the development of their jaws, and on the durability of their teeth. Those who knew him as an indefatigable worker may ere now have missed him as such, although hoping for his return; but those who also knew him as a genial, warm-hearted friend will miss him in two forms, neither of which will readily be replaced. You may have observed that by removals, resignations, and deaths we have lost in all twelve members, while our new members only number seven. This is not an agreeable fact, but it cannot be passed over in silence on that account. The additions to our numbers have during the current year failed to supply the diminution from ordinary causes. True, our resignations have been rather above the average, but I do not think that this should satisfy us regarding the meagre show of new members. I do not wish to burden my few remarks with statistics, but it requires only the most cursory observation to know that a considerable number of dental students annually pass into practice from the London Dental Hospital. Through the Odontological Society, a most valuable adjunct to study in the shape of a museum and library is brought within their daily reach. By the liberality of this Society they are free to both stores of knowledge. I cannot conceive how men can enter practice and forget these things; still less can I conceive their remembering them and not hastening with all speed to give their hearty support to the institution which has treated them so generously.

Turning to myself, gentlemen, my term of office has been peaceful and uneventful. Our meetings have been well attended. Our Transactions are full and well up to the standard of interest, and our discussions have, I rejoice to say, been brisk and instructive. The changes which have been introduced during the past year have been slight, and affecting matters of detail only. As President I have avoided attempting to introduce any innovations upon our established lines of procedure: 1st, because I think that recent changes require consolidation before we attempt fresh ones; 2nd, because I think that the want of change should be principally felt and expressed from without, and be made known by members to the Council; 3rd, because I think that members of the Council should propose changes, whether in detail or of a radical character. The most clear-headed President will find plenty to do if he conduct the affairs of the Society prudently and quietly; but if by force of character or persistency he impose changes on a too subservient Council, he may leave to his successor a legacy of trouble and care which he himself should have borne, but which the shortness of his term of office enables him to avoid. In conclusion, let me ask you all ever to think carefully over the affairs of the Society and how best to improve it. The Council—I say it with assurance—is only too anxious to do anything and everything for its prosperity. Try also to induce your professional friends to become members. It is a duty which they owe alike to themselves and to the profession.

After the usual votes of thanks the meeting adjourned.

JOURNALISTIC SUMMARY.

DENTAL COSMOS. *(January, PHILADELPHIA.)*

"THE FIRST DENTITION," by Dr. J. W. White. When dental evolution proceeds without apparent disturbances, interference would be manifestly unwise and improper; but there are other cases in which the indications point so plainly to dental complications as the disturbing element, that only preconceived opinions could prevent their recognition.

The peculiar impressibility of infancy, and the direct and sympathetic relations of the teeth to the whole organism, should be considered in forming a judgment as to the probability of disturbances of equilibrium resulting from any want of accord in the repulsive and resistive forces concerned in the liberation of the dental organs from their osseous and fibrous coverings. So also should the special tendency in infancy to reflex phenomena—explainable only by the predominance of the spinal system—be accorded the importance to which it is entitled; nor should the fact be overlooked or disregarded that the body of an infant is characterised by peculiarities of structure and function differing from the adult.

These differences explain the tendency of diseases in children to assume a sthenic type, and also explain the facility with which morbid action is transferred by extension, metastasis, or reflection to organs not generally implicated. The activity of the vascular system, the free supply of blood to the tissues, and the susceptibility of the nervous system, contributing to the creation of a special liability to intense and dangerous reactions from local irritation. Various causes may produce such an irritation of the spinal centres, that the coördinating function of the brain may be overpowered and irregular muscular actions, spasms, or convulsions ensue. Of these causes, none are more liable to act as excitants of convulsions than irritation of the fifth and the pneumogastric nerves.

"APPARATUS FOR ROTATING TEETH," by Dr. J. N. Farrar. The devices, which in this article are illustrated, are denominated Double Concentric-loop Rotators; the woodcuts clearly show many applications of the devices for rotating teeth.

In the report of the proceedings of the October meeting of the NEW YORK ODONTOLOGICAL SOCIETY, Dr. W. H. Dwinelle spoke of the administration of morphine combined with atropine for the purpose of quieting very nervous patients when they were having long and unpleasant operations performed. He used morphine for its anodyne qualities, and the atropine for the purpose of overcoming the objectionable qualities of the morphine, and for the further purpose of checking the flow of saliva. One practitioner had written he would not be without the preparation for any consideration. He had gone so far as to give it to the same patient six days in succession without any inconvenience or bad effects whatever. An hour previous to the proposed operations he gives $\frac{1}{60}$ of a grain of atropine combined with $\frac{1}{8}$ of a grain of morphine, and an hour afterwards the dose is repeated.

Dr. J. S. Codman read a paper on "INFLAMED AND SENSITIVE TEETH," upon which some discussion followed.

THE INDEPENDENT PRACTITIONER. *(January, NEW YORK.)*

"SOME EVIDENCES OF PRE-HISTORIC DENTISTRY IN ITALY," by Dr. J. G. Van Marter. The writer describes, and also illustrates, some early relics of Dentistry which were taken from Etruscan tombs and date back 400 or 500 years before the Christian era.

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"Proliferation of Epithelium in an Alveolar Abscess," by Dr. W. D. Miller. Having prepared a microscopic section of a large abscess sac from an upper bicuspid tooth, the writer was much surprised to find that the interior of the sac had a complete lining of epithelium. Not only did the layer of epithelial tissue, from two to eight cells thick, appear to cover the entire inner surface of the sac, but appeared to send sprouts into the tissue of the sac, thus forming a network of epithelial tissue, the meshes of which were filled with a reticular connective tissue, infiltrated with round cells (pus corpuscles). Two interesting questions arise in connection with this case; first, how was the epithelium produced within the abscess? Second—What effect could it have had upon the course of the disease? In respect to the first of these questions, the same principle holds true for epithelial cells as for cells in general; that is, epithelial tissue can be produced by proliferation of previously existing epithelium; it cannot, therefore, have arisen by a transformation of any of the elements ordinarily found in an alveolar abscess, but must in all probability have entered the abscess from the surface of the gum along the track of a fistula. The presence of the epithelial lining has no effect—or, if any at all, a deleterious one—upon the healing process, whether in fistulous tracks, or ulcerating, or granulating surfaces, or in abscesses. The same is probably true of those perhaps rare cases where we find in alveolar abscesses the formation of pus takes place under the epithelial layer, just as if it were not there, and the pus corpuscles may be seen everywhere passing through the layer into the interior of the sac. We have here a case in which an atypic development of epithelium can safely be said to be without any pathological significance.

"Some Points in the Application of Hydrochlorate of Cocaine to Dental Surgery," by Dr. N. J. Hepburn. A four per cent. solution of the hydrochlorate of cocaine in water was dropped into the cavity of a tooth, the pulp of which was in a few minutes removed without pain being felt by the patient. Eight drops of a four per cent. solution were injected beneath the buccal mucous membrane, in close proximity to the entrance of the inferior dental nerve on the left side, into the dental foramen. The result was anæsthesia of the lower lip, molar, canine, and incisor teeth, and partial anæsthesia of the tongue on that side. It appeared possible to extract any tooth in that region without pain, but, as the patient objected to the sacrifice in the cause of science, it was not attempted. The anæsthesia lasted just half-an-hour from the time of administration. The use of 20 to 30 drops of a four per cent. solution will often be followed by constitutional effects which, while not dangerous, are somewhat disagreeable to the patient. These are, increase in the pulse and respiration, some general anæsthesia, staggering gait, double vision, dilated pupils, dizziness, and one or two observers have reported nausea. These effects pass off in an hour or two. A fact worth bearing in mind is, that the use of cocaine diminishing congestion, blanches the part, and to some extent lessens hæmorrhage.

"CROWN WORK," by Dr. A. M. Ross. Each method of tooth crowning possesses peculiar advantages, and each case that is presented for treatment presents peculiar needs ; so it must be conceded that any one plan of treatment will not have a general application. The writer then makes some observations upon the Richmond, Bonwill and other crowns.

"ADAPTING ARTIFICIAL DENTURES," by Dr. C. H. Land. In preparing a denture so as to secure the most perfect adaptation, capillary attraction is the force to be relied on, and every effort that will have a tendency to augment or increase it will be in the right direction. It causes the denture to adhere with a force of about 2 lbs. to the square inch. On the contrary, with an air space and the exhausting power of the tongue, the retaining force is reduced to about 2 ozs. to the square inch, which would be about 1 oz. for the usual small air chamber. From this it will be seen that capillary attraction represents a retaining force thirty times greater. Experience has taught that eventually all air spaces become filled with the tissues, proving that a permanent partial vacuum cannot be maintained ; and yet, if it were possible the utility would be of less importance than capillary attraction.

A narrow and high arch presents so little horizontal surface as to reduce the retaining force to its minimum ; capillary attraction is greatest when the exertion is in a direct angle from a horizontal surface ; and in order to obtain the best results in fitting angular mouths we must resort to attraction by trimming all the perpendicular angles of the cast, thus forcing the mouth into a smaller space than the impression represented. A mouth in which the alveolar ridge is soft, and the central portion of the dental arch very rigid, unless considerable relief be made the denture will find its first contact on the palatine surface, and close adaptation will be destroyed. By relieving four-fifths of the central portion, first contact is thrown to the outside, and maximum adaptation is secured. In the construction of artificial dentures, the first step is a correct impression ; second, a proper diagnosis of the condition presented in each case : third, a proper trimming of the plaster cast for relief. Thus, keeping in view the fact that the mouth will readily conform to the denture, and that capillary attraction is of far more value than atmospheric pressure, it is possible to reach the utmost degree of success.

" PREPARING VULCANITE WORK," by Dr. S. B. Palmer. To secure union between the old and the new material, among the many methods adopted, the writer recommends the following :—Prepare the surfaces with file, bur, or scraper, as most convenient. Bevel to a thin edge if possible. When the parts are ready to receive the wax for building up, paint the surfaces with a solution of chloroform and such rubber as the case is made of, red or black. This coating should be thin, so that it may only show a gloss when dry ; not a covering of rubber, as would be the case were it thick as cream. Under no circumstances attempt to fill thin spaces or out-of-the-way places with rubber softened by a solvent. Such preparations are brittle and porous. After the surfaces have been once varnished, wax or oil does not injure or prevent union when boiling water is used to remove the same. Portions like the rim and clasps may be supplied with strips of rubber instead of wax, covering them with plaster before flasking. By leaving space in packing for the rubber to reach that which is embedded, there will always be perfect union. An effectual method of removing wax consists in boiling the case in water ; a pint basin of water heated over a lamp is sufficient. By the use of a four ounce metal syringe every particle of wax may be driven out and made to float upon the surface of the water. A piece of paper drawn over the water takes up the wax, and the case comes out clean, and with a surface well prepared to receive the rubber used in packing. Other methods may answer equally well, but the above will give positive success.

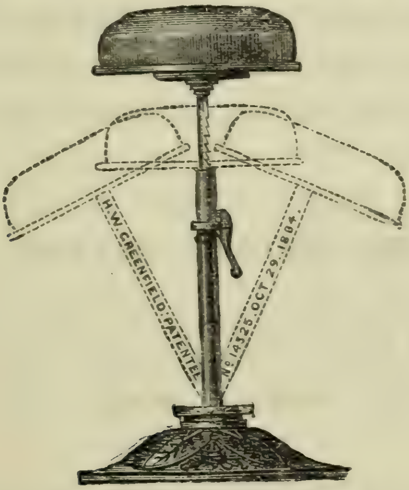
" A CASE IN PRACTICE " is recorded by Dr. Miller, in which a patient complained of often having a taste of old Limburg cheese in her mouth. There were no traces of suppuration, and but very slight decay ; but on examining the throat he at once discovered the cause of the complaint. The tonsils were very much enlarged and almost concealed by a thick, yellowish-white coat, which was found to consist of masses of many different fungi—cocci and diplococci. It was found that the fungi had penetrated the fissures between the folds of the tonsils, in some places to the depth of a quarter or half an inch, where they were entirely secured against the action of the most powerful antiseptics superficially applied. By the most careful application of 90 per cent. solution of carbolic acid considerable improvement was effected ; but the complete eradication of the fungi was not accomplished.

"The New Anæsthetic," by Dr. J. W. Russell. This is a short article on the use of hydrochlorate of cocaine.

NEW INVENTIONS.

AN OPERATING STOOL.

The annexed woodcut illustrates an adjustable operating stool, invented by Mr. Henry Greenfield. The seat can be raised without the necessity of getting off the stool ; and the pedestal, being securely held by means of a ball and socket joint at the base, any position desired can at once be assumed at the will of the sitter.



Mr. James Taylor, L.D.S.Edin., has sent us a very simple and inexpensive method of polishing large fillings on the grinding surface of molar teeth. A piece of wire, fitted as an engine bit, is divided for about $\frac{3}{8}$ of an inch with a saw or thin file. A narrow coil of sand-paper is wound round the spindle, the divided portion holding one end, and this is kept intact by an elastic band. As the sand-paper wears away, fresh layers underneath are brought into use. It is an application of the principle of Richardson's chuck for the workroom lathe.

OBITUARY NOTICES.

The announcement of the death, on the 6th ult., of Mr. J. R. Mummery, L.D.S.Eng., at the age of 75 years, will be received with regret. He established himself as a Dental Surgeon at Dover in 1843, and during the fifteen years he remained there gained the high reputation which he afterwards maintained. In 1858 he removed to London. He held the Presidentship of the Odontological Society in 1871. Amongst his numerous and valuable contributions to the *Transactions*, that which is most widely known, is the paper on "The Relation which Dental Caries amongst Aboriginal Races holds to their Food and Social Conditions," which he read before the Society in 1869. He was also for many years a member of the Committee of Management of the Dental Hospital of London. Mr. Mummery was an accomplished botanist, and took great interest also in marine zoology. He was a Fellow of the Linnean and the Royal Microscopical Societies, and numbered amongst his intimate friends many well-known men of science.

William Murray Parson, of Great George Street, Bristol, died about the middle of December last. He had been ailing for some time.

William Margetson, L.D.S.Eng., of Roscoe House, Dewsbury, died January 29th, at his private residence, Cliffe Terrace, Horbury, in his 57th year.

THE DIPLOMA TRAFFIC.

The *Independent Practitioner* says:—"Under the above heading *The Dental Record*, of London, briefly reviews some of the abuses of authority on the part of American colleges. The editor closes the article by saying—

"'The loose manner in which degrees are conferred by certain dental colleges in the United States is notorious. Justice and good faith to those graduates who have complied with the educational requirements are looked for, and the honour and status of the dental profession demand their careful keeping. The bold course of action taken in this matter by the *Independent Practitioner* deserves the thanks of the profession at large.'

"That bold course made us enemies, as we expected it would, but the results have been even greater than we anticipated. We can assure our contemporary that we believe a substantial reform has been brought about, that this standing reproach to American dentistry has been removed, and that hereafter all reputable American colleges will, after this present term, refuse to graduate students except after attendance upon at least two full courses of lectures, of not less than five months each, the separate courses to be delivered in different years. We believe that *The Record* will be enabled to amend its expression in the first line quoted, and in future to say only—'The loose manner in which degrees *were* conferred, etc.' At any rate, woe be to the college that infringes the new rule. State laws will enable State societies to throw out their diplomas and prevent their graduates from entering upon practice, and this is a power that the larger States will not hesitate to use."

Editorial.

MESMERISM.

THE phenomena which we know by the term "Mesmerism" have been recognised for ages. That appellation originated with Franz Mesmer, who graduated M.D. at the University of Vienna in 1766, and died in 1815. The peculiar states of "animal magnetism," like other phenomena, appear to receive attention at periodical periods. With Mesmer the study of that condition or influence which certain individuals can exert upon others, better expressed by the word hypnotism, cycled into prominence. Though it was not unknown in previous times, Mesmer gave fresh impetus to the consideration of the subject, hence arose the designation "Mesmerism." Again in later years, there have not been wanting writers upon the question. Notably in 1843 there appeared a periodical publication called *The Mesmerist;* but it did not live many months. At about the same time, Mr. James Braid, M.R.C.S., and others, practised and wrote upon the different aspects of hypnotism. In 1861 the attention of the Dental Profession was directed to the agency of Mesmerism for painless tooth extraction. The late Dr. M'Quillan communicated to the New York Odontological Society his experiences in that connection. Now, once more, the notice of the Profession is attracted to the application of hypnotic sleep in painful dental operations ; and the two articles upon the subject in this number of the DENTAL RECORD will possibly awaken the interest of many readers.

Mesmerism, or Hypnotism, is a fact. So is emotional excitement, catalepsy and hysteria. Yet there is no imponderable substance brought to bear, nor spiritual or supernatural action. There is no evidence whatever of the existence of a specific force. The condition of the hypnotised individual is a state of cerebral reverie and abstraction, a kind of overwrought dream. "The real origin and essence of the hypnotic condition," says Mr. James Braid, M.R.C.S., "is the induction of a habit of abstraction or mental concentration, in which, as in reverie or spontaneous abstraction, the powers of the mind are so much engrossed with a single idea or train of thought, as, for the nonce, to render the individual unconscious of, or indifferently concious to, all other ideas, impressions, or trains of thought." "The state of mental concentration which is the basis of hypnotic sleep enables the subject to exhibit various passive or active manifestations, such as insensibility or exalted sensibility, rigidity or agility, and entire prostration or inordinate energy of physical power, according to the trains of ideas and motives which may arise spontaneously in his mind, or be addressed to it by others through the impressions on his physical organs." The individual is absolutely in the power of the "medium," and the occurrences during hypnotic sleep are not present to consciousness during the normal state. This condition may rightly be considered as not a more exalted, but, rather, a more fettered state of the mind. There is a total abnegation of will, self-control, and responsibility ; and complete obedience to the caprice of others, or to the sway of whatever instinct or fancy the mind may incite.

The pulse is modified in rapidity, in volume, and in force. Females are more susceptible to the hypnotic influence than males ; while infants and young children are not impressible. Some persons appear to be altogether antipathetic to it, and others can be influenced only so far—consciousness and sensation being partly, not wholly, suspended. The mesmeric state can be self-induced, so can emotional excitement, catalepsy, and hysteria. For a "medium" to induce the hypnotic condition, the subject must be conscious of the intentions of the operator. Feuchtersleben, in his "Principles of Medical Psychology," translated by the Sydenham Society, gives a very careful and interesting analysis of the phenomena. The translation says:—"There arises, even without preceding normal sleep, a state of somnambulism, the course of which it is usual to indicate by several degrees. The first degree, with individual modifications, presents in essentials the phenomena of idio-somnambulism, and differs from it only in the absence of preceding normal sleep. . . . The second degree (a transition, which, however, by no means takes place in all cases) presents phenomena of a more profound absorption in self, a more intense sleep, in which the patient seems to be deprived of all consciousness and all sensation. Yet, even in this second degree, those sympathies and antipathies appear which manifest themselves more decidedly in the third. The approach of certain men, or of metals, produces convulsions in the countenance or limbs of these patients; the approach of other persons, or of the magnet, relieves them. This latter circumstance, connected with the artificial excitement of this state by the animal magnet, has caused the use of the term 'animal magnetism.' The third degree, exalted sleep, which is designated by many persons as inward waking, . . . produces the very surprising phenomena of the so-called 'clairvoyance.' The patients now begin to answer or to speak of their own accord; they are sensible sympathetically or antipathetically of the quality of objects, as if through the instrumentality of the atmosphere that surrounds them, . . . enter *en rapport* with persons who are in sympathy with them, . . . in short, play a part quite peculiar, which they carry through during the sleeping fits, but have forgotten when they awake."

The application of hypnotic sleep to medicine and surgery has long been practised. Numerous cures of various disorders are recorded; but nearly all, if not all, such diseases were of the nervous variety—had some mental, emotional, cataleptic, or hysterical aspects. The immunity from pain has also been taken advantage of for performing surgical operations. In these relations the employment of the mesmeric influence has often been successful, and testimony to the utility of it is added by the cases recorded in these pages. Therefore it is not reasonable to regard mesmerism as humbug, and its disciples as humbugs and impostors. Yet all that has been said of it, and of the things accomplished by its influence or during the hypnotic state, is not true. Mesmerism is largely mixed up with humbug, and its practice is almost entirely empirical. A spiritual aspect of mesmerism is accepted by some individuals. They also believe that the "medium" has the power to induct as he pleases the agency of good or evil spirits. Indeed, many have ascribed mesmeric phenomena to satanic agency; but there is no evidence whatever of any spiritual or supernatural action. Withal, as already mentioned, hypnotism is true. The condition is real. Perfect anæsthesia can be induced, and minor surgical operations, at all events, be painlessly performed. There are very many such cases published, and the evidence and testimony are beyond the faintest suspicion.

GOSSIP.

At the annual meeting of the Dental Students' Society of Glasgow, held at Anderson's College on the 21st ult., the following officers were elected for the ensuing year :—*Honorary Presidents*—Messrs. J. R. Brownlie, L.D.S.Eng.; W. S. Woodbrom, L.D.S.Glas. *President*—Mr. James Cumming, L.D.S. *Vice-President*—Mr. W. H. Gray, L.D.S. *Treasurer*—Mr. William Carruthers, 68, Bath Street. *Secretary*—Mr. James Cameron, L.D.S.Glas., Main Street, Gorbals. *Custodier*—Mr. James M'Cach, L.D.S.Glas. *Council*—Messrs. D. R. Cameron, L.D.S.Glas.; W. H. Foulds, L.D.S.Glas.; W. Lang, L.D.S.Glas.; H. Geercke; Jarvie; H. M'Kay; R. Riddle.

A man who gave his name as Arthur Hooper Broadhurst, *alias* Thomas Mansell, *alias* Turner, *alias* Marshall, was charged at the Hanley Borough Police Court, on the 6th ult., with having obtained money under false pretences. The prisoner went about from place to place representing himself as a Dental Surgeon in reduced circumstances, and sought pecuniary aid. He admitted his entire ignorance of Dentistry. He was convicted as a vagrant, and sentenced to one month's imprisonment with hard labour.

Mr. John Trude Fripp, L.D.S.R.C.S.I., has been appointed one of the Dental Surgeons to the London City Mission.

Mr. Henry J. Moxon, L.D.S.I., has been appointed Dental Surgeon to the North Surrey District Schools, Anerley, at a salary of £50 per annum.

THE

DENTAL RECORD.

Vol. V. MARCH 2, 1885. No. 3.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. Boyd Wallis, L.D.S.Eng., &c.

Part XIV. Dynamo-Electric Machines—*continued.*

Gramme's Machine.—This machine, which is one of the best forms of dynamo, and has produced the most remarkable results, was originally designed, so far as its general arrangement goes, by Paccinotti, of Pisa, and by Worms, of Romilly. This is shown by a description published by Paccinotti in the *Nuovo Cimento* for 1860, and by a patent taken out by Worms on the 3rd March, 1866.

The principle of the Gramme machine, which was first brought out in 1870, differs from that of Paccinotti's only in the method of combination of the currents, but it is to this improvement that the success of the machine is in a great measure due. The Gramme consists essentially of a *ring* armature, which is completely overwound with coils of insulated copper wire. The ring is made up of a bundle of annealed iron wires, and is so wound as to prevent induction currents; it is wound in separate sections, the ends of each coil being joined to strips of copper, which are insulated from each other, and fixed symmetrically as a commutator around the axis, like a split tube. Thus the coils of the separate sections of the ring are connected together in series, each strip of the commutator being united to one end of each of two adjacent coils. Metallic brushes press against the split-tube collector to receive the current.

If we conceive the ring armature inserted in the place of the Siemens armature (Fig. 68) we may follow out its relations to the magnetic field, and trace out the points in which a ring armature differs from the bar or horseshoe types. In these latter the armature, as a whole, reverses its relation to the magnetic field, *and assumes two distinct conditions at different times.* In the ring type, *the different parts* of the armature assume these conditions *successively*, and thus set up a rotation of the molecules of the wire as in other cases ; but *as a whole, the two distinct conditions are assumed at the same time* in the two halves of the armature on each side of a line drawn up across the ring (Fig. 68, page 21) from top to bottom. The effect of the rotation of the armature being that in one-half of the ring the current is developed in the direction from top to bottom by the north pole, and in the other half of the ring in the contrary direction by the south pole. Consequently, if the opposite points of the armature be joined by a conducting wire, as in Fig. 68, a current of constant direction would be generated, passing from south to north of the ring in a direction the reverse of that indicated by the arrows. The electro-magnets are excited by passing round them the current generated in the armature.

Gramme has invented other forms of machines to supply currents alternately reversed, and so arranged that the action of the machine may be divided and made to yield currents in several distinct circuits.

Gramme's Plating Machine was constructed in 1873. It weighs 177·5 kilogrammes, of which 47 kilogrammes are due to the weight of the copper. It is 0·60 m. in height, and has a width and breadth of 0·55 m. It will deposit 600 grms. of silver per hour in an electrolytic bath, with a $\frac{2}{3}$ horse-power driving machine. The field magnets are not wound with copper wires, as in the ordinary Gramme machine, but both halves of each tripolar magnet are completely surrounded with a sheet of copper, so that altogether the copper conductors of the field magnets consist only of four broad strips or sheets of copper. The coils of the ring armature consist of thick wire flattened.

Generators suitable for *galvano-plastic* purposes must produce currents of low intensity, but in large quantity, and this is to be obtained only by means of coiling with thick copper wire, or ribbon, offering a low resistance. An automatic current interruptor is connected with the generator, which prevents polarisation currents reaching the machine from the baths and traversing it in the opposite direction.

Gramme's machines are made in several sizes, to give from

2,000 to 16,000-candle lights, the horse-power required being from 1½ to 6; the weight is from 1 to 8 cwts., and the cost from £50 to £300. Two of Gramme's machines of 16,000-candle power each were employed to work the electric lamps on the Thames Embankment.

Siemens' Machine.—This machine, shown in plan (Fig. 69), invented by Siemens and Hafner-Alteneck, is founded on nearly the same principle as that of Gramme, and is one of the most widely-known and best machines of the present day. It consists of a stout frame, upon which are fixed four powerful flat electro-magnets, the right pair having their north poles facing one another and united by arched pieces or cheeks of iron; the left pair—south poles—being similarly united. In the space between the right and left cheeks lies a horizontal axis, upon which rotates an armature consisting of fifty-six separate longitudinal coils, each end of each coil being connected with a copper bar forming one segment of the *collector* or *commutator* at the anterior end of the axis. The armature

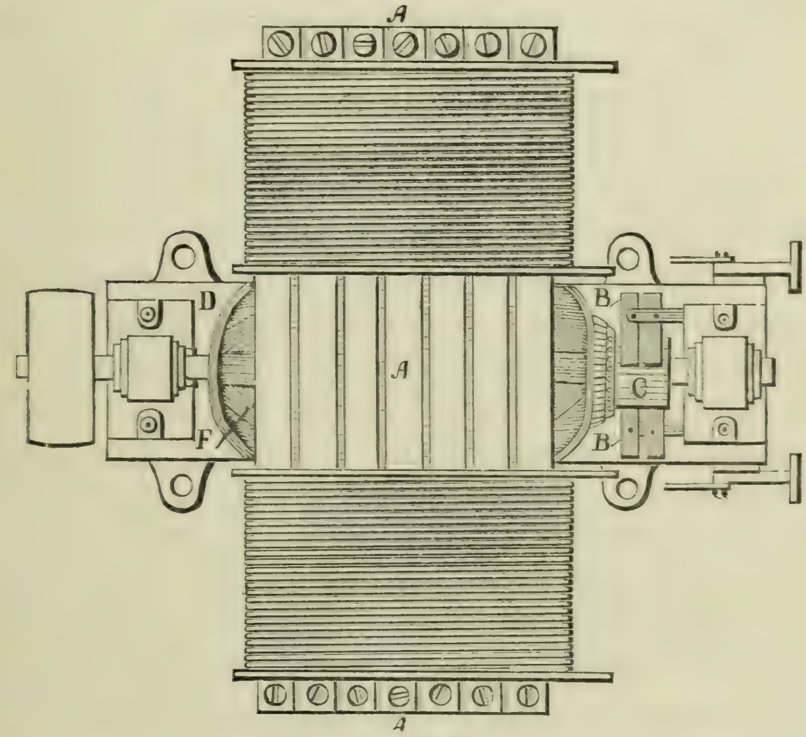


Fig. 69.*

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* Siemens' Dynamo: Plan—A A represent the upper portion of the field-magnet B B the metallic brushes, C the commutator from which the currents are collected, D the armature cylinder, and E the armature.

of this machine differs from the Siemens' armature of the earlier simple longitudinal type only in the multiplication and arrangement of its parts, the current given being practically continuous from this division into so many paths. The collector, which is made up of copper bars or segments fixed upon a cylinder of insulating material, may be considered as a split tube; therefore the current cannot pass from one segment to the next without traversing one of the fifty-six coils of the armature; and, as the end of one coil and the beginning of the next are both connected to the same commutator bar, there is a continuous communication round the whole armature. A pair of metallic brushes, pressing against the commutator, and which touch opposite sides at points above and below, lead away into the circuit the current generated in the coils of the rotating armature. Hence, the coils being joined as described to the commutator bars, all the currents thus generated in one half of the coils will be flowing *into* the external circuit at one of the commutator brushes, and all the reverse currents of the other half of the coils will be flowing *out* of the other brush. The terminal screws connected by wires to the commutator brushes correspond to the + and — poles of a galvanic battery. The coils of the field magnets are included in the external circuit.

The *Siemens Plating Machine*, another interesting type, is used for the preparation of pure metals. It will precipitate daily five to six hundredweight of copper, requiring eight to ten horse-power. The electro-magnets of these machines are encircled by thick, square-sectioned copper bars, which make seven turns round each limb of the magnets. The armature also carries only one layer of windings of the bands of copper, which correspond to the coils in the other generators, and are connected with the collector by suitably bent pieces. The contact-brushes which bear on the collector are of stout plates of copper. The several copper parts are insulated with asbestos, which prevents destruction of the insulation, however hot the copper conductors may become.

When the Siemens' machine is set in motion there is little resistance, but a few turns of the armature are sufficient to collect in its coils, from the feeble induction of the residual magnetism, enough electricity to greatly strengthen the magnetic poles, which induce stronger currents in the coils; and this continues, on the principle of mutual accumulation, until the magnet is saturated and the machine gives its strongest current.

The largest size of Siemens' continuous current machines—type D_{00}—runs at a speed of 400 revolutions per minute, with 20 horse-power, supplying light-power of 50,000 standard candles, its cost being £360. One of the smallest sizes—type D^6—runs at 1,300 revolutions per minute, with 2 horse-power, supplying light-power of 1,300 candles, and costs £55.

The above speeds refer to a circuit of low resistance; for higher resistances, the speed must be increased.

Several lighthouses around the English coast are now illuminated by these machines. In the competitive trial carried out by the Trinity Board, to ascertain the most economical machine for lighthouses, the Siemens' machine gave the best results.

BRUSH'S MACHINE. — Is employed by the Anglo-American Brush Company. It differs from the foregoing in point of detail; it is furnished with a ring armature, which resembles Paccinotti's ring in outward appearance, but the connection of the wire coils is different. The iron ring is deeply grooved to allow the heat generated in the metal by the action of the machine to radiate away. It is made deep in section, and the magnets are placed on each side. Spaces are left between the coils, which are wound in recesses sunk into each side of the ring. The ends of the coils are coupled up by joining the first and last ends of the opposite sections together, the two remaining ends being carried to insulated contact strips on opposite sides of the collecting drum or axle. For each pair of coils there is a similar arrangement of contact, the separate contact strips being grouped together and communicating to two or more pairs of brushes that rub against them through the currents which they collect in rotating. The electro-magnets are excited by the whole or part of the armature current. In these machines it is usual to wind a few layers of fine wire round the electro-magnets before the heavier wire is put on, by which a current is induced in the magnets irrespective of the main circuit.

The Brush machine gives very powerful currents, and is intended to supply a number of arc lights. The currents are somewhat dangerous to life, if not properly insulated on the wires, and some fatal accidents have happened with them. The currents from ordinary dynamos needed to supply one or two arc lights or a number of incandescent lamps, are not at all dangerous to life.

A Brush machine, capable of maintaining 16 arc lights in circuit, with an external resistance of over 70 ohms, has an internal resistance of 4 ohms, and requires about 14 horse-power to drive it with a speed of 700 revolutions per minute. The largest of these machines, capable of maintaining 40 arc lights, have an electromotive-force of over 2,000 volts.

Other machines having modifications of the ring-armature have been invented by Gülcher, Schuckert, Bürgin, and others.

Siemens, Ball, and others have devised another class of dynamo, called "uni-polar," differing from either of the preceding, in which a coil or other movable conductor slides round one pole of a magnet and cuts the lines of force in a continuous manner without any reversals in the direction of the induced currents. These machines have, however, very low electromotive force.

Ball's machine may be said to be nothing more than two small Gramme machines connected together to do the work of a somewhat larger one of the ordinary construction, and its action appears to be precisely that which takes place in the Gramme.

EDISON'S MACHINE is the largest dynamo-electric generator hitherto constructed for electric lighting. This machine, called the *steam-dynamo*, is built upon one massive cast-iron base, with the steam engine which drives it, the latter being connected to the armature shaft direct, the whole weighing 22 tons. The electro-magnets are of great bulk, the coils being about 8 feet long, and producing an intense magnetic field. The armature, which is a modification of the drum-armature of Siemens, is made up of 98 rods of solid copper about half a square inch in section, and over 3 feet in length, which are connected by copper discs at the ends instead of coils of wire. The commutator or collector consists of 49 parallel bars of copper, similar to the split-tube commutator of the other machines. The circuit of the armature runs from one bar of the commutator along one of the copper rods into a copper disc at the far end, crosses by this disc to the opposite rod, along which it comes back to the front end to another copper disc connected to the next bar of the commutator, and so on through the other rods all round. By this arrangement the wasteful resistance of the armature is greatly reduced, and the efficiency of the machine increased. The interior of the armature is made up of thin discs of iron strung upon the axis, to intensify the magnetic action while avoiding the currents which would be generated wastefully in the mass of the metal were the iron core solid. Five pairs of brushes are arranged at the commutator to diminish sparking. The field magnets are wound on the *shunt* system. This machine, which has a very high efficiency, and turns 90 per cent. of the mechanical power into electrical power, is driven at a speed of 350 revolutions per minute by an engine of 125-horse power, yielding 900 ampères of current, and an electromotive force of 110 volts. The resistance of the armature is only eight thousandths of an ohm, and of the electro-magnets 30 ohms. The machine is capable of supplying 1,300 Edison's incandescent lamps at one time. One of these machines was used for the incandescent electric lighting on the Holborn Viaduct last year; and twelve of them are employed at the central station in New York for a like purpose. The current generated by this machine is not considered dangerous to life.

Electric Motors.—Passing from dynamos, we come to the small electric motors which have been devised by several inventors

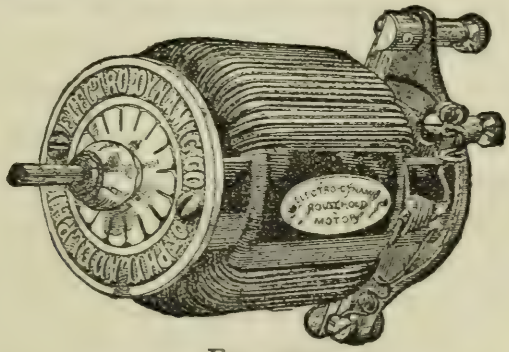

Fig. 70.

for driving sewing machines, lathes, dental engines, punkahs, &c. Such motors have been constructed by Trouvé, Marcel Deprez, De Meritens, Jablochkoff, Ayrton and Perry, and others; but perhaps to Dental Surgeons the most interesting of these, and the most efficient for its size, weight, and cost, is the little motor invented by Mr. W. W. Griscom, of Philadelphia, illustrated in Fig. 70, and for which the Dental Manufacturing Company are agents. This motor consists of two semi-circular electro-magnets, which together form a ring, and which are wound with insulated copper wire. Two bare zones of the ring above and below, which extend laterally beyond the ring and form supports for the brackets which carry the bearings of the armature and the brushes of the commutator act as *north* and *south* poles. Within or between these poles a Siemens' armature revolves, the current being led to it by terminals and commutator brushes. The current traverses the coils and rotates the armature which drives a pulley that gives motion by a strap to the pulleys of the dental engine, sewing machine, &c. The great power of this little motor is due to the fact that the currents induced in the coils of the magnet by the rotation of the armature are caused to assist the magnetising current supplied to the ring coils by the commutator, and thus heighten the magnetism of the ring poles. The motor is 2¼ inches in diameter and 4 inches long, and its weight is but 2½ lbs. With the current from a bichromate of potash battery of six cells it will attain a speed of 5,000 revolutions per minute. It is the most compact and powerful small electric motor with which I am acquainted; it is low in price, simple in construction, excellent in all its mechanical details, and its adaptability to dental purposes is all that one could desire.

The batterry for driving this motor differs from the ordinary bichromate in the arrangement of the elements and size of the cells, which are of one gallon capacity in the full size battery. The elements can be automatically raised or lowered to any depth into the cells with the greatest faacility by means of a treadle lever; and by this means the strength of the current, and consequent speed of the motor, can be regulated to the extent desired.

It may not be out of place to give here the formula for a new solution which is said, by Dr. Egger, a German experimenter, to give excellent results with the zinc-carbon battery,—viz., Sulphuric acid, 200 cubic centimetres; Bichromate of potash, 25 to 50 grammes; Nitric acid (34 per cent.), 100 cubic centimetres; Water, 200 centimetres. With 50 grammes of bichromate the current remains very constant for a considerable time, there being no very marked diminution after 17 hours' continuous working. The use of bichromate of potash very materially lessens the nitrous fumes usually given off by the nitric acid solution.

The cost of working the Griscom motor has been estimated to be about 1d. per hour per horse-power of energy obtained.

TROUVE's motor is simply a Siemens' machine with electro field magnet, but the armature ends elliptic instead of circular.

Continuous current motors are derived from any of the Dynamo machines, the Gramme ring being considered the best adapted to the purpose.

AYRTON AND PERRY's is a more powerful and heavier motor, and is well adapted for driving circular saws, large emery wheels, large circular ventilating fans, &c. In principle it may be considered an inverted Gramme machine, with the armature ring made stationary and modified in construction to resemble the armature described in Mr. Sprague's patent of November, 1878, which is a Paccinotti ring constructed of discs of sheet iron instead of solid metal, and the field magnet in the interior is a Siemens core.

De Meritens' motor resembles in its armature that of Ayrton and Perry's, but the armature is movable, as in the ordinary dynamo machines. It has a circular electro-magnet enclosing the armature, and forms two poles, as in the Griscom motor. But these two differ in principle, inasmuch that in the former the Paccinotti armature is used, and in the Griscom the old Siemens core is employed; so that one is a continuous action, while the other is alternating.

According to Profs. Ayrton and Perry, the efficiency of various motors is as follows:—

Motor.	Weight in lbs.	Res.	Current.	Revs. per min.	Horse Power.	Efficiency.
Griscom	2·5	1·1	3·9	513	·00225	·0542
Ayrton and Perry ...	37·	·2	25·9	720	·14	·317
De Meritens .	72·	·850	10·6	860	·154	·51
Siemens	519·	—	—	906	4·96	·746

Combination Machines.—The field magnets of a dynamo are in some cases wound with two sets of coils, in order that it may be used as a combined shunt and series machine. These machines, when run at a certain speed, may be made to yield a constant current, or to work at a constant E.M.F., whatever the resistances in circuit. Either of these ends may be obtained by combining, in one case a shunt-winding, in the other a series-winding, with an independent magnetisation derived either from a permanent magnet or from a separately excited field magnet.

In the foregoing description of dynamos and motors it will be seen that the arrangements of coils, commutators and magnets can be varied in many ways, but the principle on which electricity is produced by dynamo machines is the same in all, viz., that coils of insulated wire are made to pass through magnetic lines of force thus inducing a current. The wire coils are generally wound on soft iron cores, which themselves become temporary magnets when in the magnetic field, and react on the wire, intensifying the current; but these cores, however, increase the development of heat, and are therefore sometimes dispensed with. When in use, and the point of *saturation* with magnetism of the iron core is reached, it cannot be made more powerful no matter what amount of current be sent round the surrounding coil of wire for that purpose.

Hence, there is also a limit to the current that the electro-magnets can induce in the coils of the armature revolving at any given speed. Theoretically, the strength of the current can be increased to almost any extent by increasing the speed of revolution of the armature coils. But the safety of the machine necessitates a limit to about 1,500 revolutions per minute for the smaller machines, and a proportionally less speed for the larger sizes, because the action of centrifugal force and the heating of the various parts of the dynamo render higher speeds dangerous. The size of the wire with which a dynamo is wound is regulated by the nature of the work it is intended for.

The armature should be wound with *many turns* of wire of small diameter for producing currents of high E.M.F. Great resistance is caused to the passage of the current by such small wire, and the machine is then said to have a large internal resistance. But for the production of a current of low E.M.F., the armature must be wound with a *fewer number of turns* of wire of *larger diameter*, when the machine will be said to have a small internal resistance.

Without direct and careful experiment it is difficult to estimate the relative efficiency of any two dynamos, but some experimentalists believe that the useful work given out by the machines of the leading makers does not vary much in amount, and consider it practically proportional to the power consumed in driving them. The most available sources of power for driving the dynamo-electric machines are *Turbines or Water-motors*, *The Steam Engine* and *The Gas Engine.* As to the respective economy of these sources of power, a great deal will depend upon local circumstances; the steam engine affords a simple and economical means of providing power where a large supply is required.

The utility and the possibility of the employment of a dynamo depend upon the *cost of a unit of energy* delivered by it, and this is based upon—first, the cost of the source of energy; second, the efficiency of the conversion. According to Sprague, the oxidation of 1 lb. of coal gives the same energy as that of about 7 lbs. of zinc, which costs twenty-four times as much per pound, so that the source of the energy is in one case 150 times as costly as the other, and no amount of efficiency can make the cost of energy produced comparable. For this reason it is quite impossible for any electro-motor to be worked with a battery except at enormous expense, as long as the battery product is valueless. Joule calculates that, under the most favourable circumstances, an electro-magnetic engine would consume 75 lbs. of zinc in a Daniell's battery to maintain one horse-power for twenty-four hours.

As to the particular advantages of various kinds of machines, the alternating current-current dynamos are necessary in electric lighting with Jablochkoff and other candles, and are preferable when it is desirable to burn away the carbon points evenly, and to prevent residual magnetism in the electro-magnets of these lamps. But continuous, or direct, current machines are preferable when the largest possible yield of work is required, and when the uneven consumption of the carbons is an advantage rather than otherwise, as in the lighting of public halls, &c., for when the upper carbon point forms the positive pole, the " crater " (see page 348, August number 1883) which is there formed acts as an efficient reflector, directing the rays of light downwards. Moreover, these machines yield 35 per cent. more effect in the luminous arc than the alternating-current machines. In galvano-plastic and other electro-metallurgical operations, the continuous current machines must be employed.

Amongst other uses to which dynamos have been applied that of the production of the electric light may be considered the most important; but they have proved of the greatest value for other purposes, particularly for plating and electro-typing, for which purposes they supply a perfectly constant and uniform current, more cleanly and convenient, and more economically than galvanic batteries. By their means *the coating of very oxidizable metals with other metals* can be accomplished on a large scale, *pure metals* can be obtained by the same means in large quantity; they are also employed for the *preparation of ozone*, and for the *melting of very refractory metals.* To the late Sir William Siemens is due the merit applying the electric arc to the fusion of refractory metals, and for this purpose he constructed an electric furnace, which consisted of a graphite crucible, placed in a metal vessel which it does not touch, but is surrounded by a layer of charcoal to prevent contact. A bar of gas-carbon, which acts as the positive electrode, projects through the bottom of the crucible into the interior, whilst the other electrode, which is of compressed carbon, passes through the cover of the crucible. The electrodes are kept at a suitable distance from each other by an automatic regulator. The current is conveyed to the electrodes by wires from the dynamo, and the arc produced by it is so powerful that platinum, nickel, and the most refractory earths are readily fused by it. With a dynamo requiring four horse-power to work it, and producing a current of 36 ampères, Siemens found that a crucible 20 c.m. in depth was rendered white hot in less than 15 minutes; and in 15 minutes more about 2 lbs. of old files could be melted. Twenty pounds of steel have been melted by this means in one hour. A temperature of 1,800° C. is required to melt steel.

Amongst the uses already named for which the dynamo can be employed that of *Telegraphy* may also be added. The first experiments for this purpose were first carried out in India, in 1879, by L. Schwendler, who employed the portion of a current of a powerful dynamo in the Government Works at Alipore, and conducted it through a wire between Agra and Calcutta, a distance of 850 miles, and so transmitted telegrams without affecting the power of the electric light at Alipore. The Western Union Telegraph Company now solely employ dynamos for telegraphic purposes. The current from these machines supplies 360 wires issuing from the principal station. By adapting the dynamo for this purpose the Company estimate that their working expenses are reduced 50 per cent., whilst the space occupied by the generators is only one-tenth of that formerly occupied by the batteries, and they require only one engineer to superintend the whole of them.

When the cost of electric generators becomes reduced they will doubtless be in more general use for medical and physical laboratory purposes; but this will in a measure depend upon *their application to the transmission of power.* The principle of this transmission of power is, that by transmitting the motion of a steam engine to a dynamo a current is produced; this current is then conducted by wires to a second dynamo, where it is again converted into mechanical work. But with dynamos as at present constructed only about 50 per cent. of the work done at one station is obtained again at the other.

At present the electrical transmission of power has been utilised, amongst other purposes, for the working of agricultural machines from motors stationed at a distance, for electrical railways, hotel and warehouse lifts, &c. It has been proposed to utilise the water power of Niagara Falls to light the cities and drive the mills of New York and other towns far away. It was at first thought that the transmission of power by means of the Falls of Niagara would necessitate a cable of immense thickness; but Professor Perry, of London, is of opinion that, with a suitable arrangement of the dynamos, and with the conducting wires sufficiently insulated, the whole energy of the Niagara Falls might be transmitted to Boston and New York through an ordinary telegraph wire. Probably the time is not far distant when, electric light and power corporations having been fairly launched, and central stations for generating and transmitting the electric current to towns and factories having been established, the inhabitants will be able to convert it, as they may desire, either into light, heat, or mechanical motion.

PRACTICAL EXPERIENCE IN THE USE OF OXY PHOSPHATE CEMENTS.

By Dr. W. D. Miller, Berlin.

On beginning the practice of dentistry in Berlin in the spring of 1879, I found a filling material extensively used by German dentists which I had never met with in America.

It at once attracted my attention on account of its superior hardness and apparent greater durability; it was also very highly commended by different practitioners with whom I spoke concerning it. This material was the now well-known oxy-phosphate cement.

It possessed a very evident advantage, in that it could be had in all possible desirable shades of colour.

I immediately set about to determine by experiment the comparative solubility of the new material and the older oxy-chlorides in various solvents which were likely to be found in the human mouth. The results of these experiments were presented at the

Lucerne meeting of the American Dental Society of Europe, in 1880. I bored holes, all of the same size, in strips of hard wood or ivory, filled them with the various cements to be tested, and immersed the strips in solutions of various organic acids, also in mixtures of saliva and bread, saliva and sugar, etc., etc.

The result was the same in all cases.

The oxy-phosphates, Poulson, Wolff, Lorenz, Rostaigne, etc., withstood the action of the solvent about equally well, and far better than any of the oxy-chlorides.

This is a result which I have also found to be justified by practical experience, as I can show fillings to-day which have been in the mouth over five years, and are still holding well.

One other result of these experiments was to induce me to use the oxy-phosphates to some extent in my practice, an unfortunate result, for I am now convinced that of all materials put into the hands of dentists for filling teeth, the oxy-phosphates are the most unreliable and treacherous. We sometimes see fillings so situated that they are constantly kept clean, which have stood the test for years with scarcely any alteration ; while, perhaps, in the very next mouth that we examine we will find fillings which were inserted only a few weeks previous crumbling to pieces. Even after I had had a number of failures I was not willing to give up the material entirely. I held to the view that the fault was not in the material, but in the operator, and that greater care in mixing the cement, greater care in inserting it, excluding every trace of moisture, and greater care in properly finishing the filling, would insure uniform and good results.

I now know that the fault lies, in a great part at least, with the material. If the manufacturer succeeds in producing a good article, which is not by any means always the case, it being sometimes necessary to call back a "batch" after it has been distributed among the consumers, and if the operator succeeds in keeping it under such conditions that it does not attract too much moisture, and if he by chance mixes it in just the proper proportions to give the best results, and inserts it and finishes the filling with the proper amount of care, under complete exclusion of moisture, then, in crown cavities, it *may* in some mouths last four or five years, or even longer. The filling should always be examined a few days after insertion, to determine whether it has properly hardened, and in no case can it be guaranteed to last a certain number of years, or even months.

In all those cases where a filling of the nature of cement seems most to be indicated, in extensive cavities, on the approximal surfaces of bicuspids and molars, nearing the pulp, it has proved a failure, unless employed as a temporary filling, and even then its value is very questionable.

If we make, with all due caution, a filling of oxy-phosphate on the approximal surface of a bicuspid tooth very soft, decayed under the gum, and pulp nearly exposed, the chances are that at a time by no means very far off the patient returns with an aching tooth ; we find a large cavity under the margin of the gum and an exposed, inflamed pulp. In such cases cement should not be used, even for temporary purposes, unless the neck of the tooth is protected by a layer of gutta-percha.

This result is brought about, not by the disintegration of the cement alone, but secondary caries seems to progress with considerable rapidity, because the antiseptic property of the filling material is almost zero, and because the concavity produced by the dissolution of the cement, as well as the roughened surface of the same, retains particles of food, and possibly because the oxy-phosphates contain substances well suited to the wants of the micro-organisms of decay.

I do not say that the result will *always* be as I have indicated. I have seen many notable exceptions, but it will be so in such a large proportion of cases as to render it entirely unsafe to place any confidence in a filling of oxy-phosphate ; so that now, after an extensive experience in the use of this material, I have abandoned it altogether, except for upper front teeth, where the patient objects to the use of gold on account of its appearance ; or occasionally for temporary teeth and for setting pivot teeth.

As a capping for exposed pulps, oxy-phosphates have, in my experience, proved an equal failure. Personally, I have never made use of it for this purpose, but I have had abundant opportunity to watch its effect when employed by others, and the number of fillings that I have been obliged to remove on account of the supervention of pulpitis and pericementitis is sufficiently great to render its use in my own practice unjustifiable.

Especially where it is necessary, for some cause or other, to leave decayed or softened dentine in the cavity, oxy-phosphates with it ; he was in the habit of lining the cavity and filling it to about three-fourths with soft gold condensed by the Herbst method, and then building on to this cohesive gold condensed with smooth points. He could not help thinking that this discovery had a great future before it. Certainly by no other means could such perfect adaptation be obtained with so little trouble.

Dr. Field said he understood that the matrix was to be wedged between the teeth so as to close a great portion of the mouth of the cavity. It seemed to him that this must often complicate things a good deal, and even render the use of a right-angle attachment necessary when it would not otherwise be needed.

Mr. Tomes said this difficulty could be got over by bending the matrix, making it somewhat convex. It was possible to do without a matrix altogether, but it greatly increased the difficulty of the operation, since the gold was so much more liable to shift its position under the rotating point.

Mr. Walter Coffin exhibited an operating stool, or body-rest, of novel construction, designed by his brother, Mr. Harold Coffin. It consisted of a plush-covered saddle, rotating and screwing up and down upon an upright stem attached to a firm base by a strong conical spiral spring, which gave it some vertical play and unlimited angular motion in all directions. Though in unstable equilibrium when sat upon, it formed a tripod with the legs of the operator, and so assisted and supported, without restraining the motion of the body.

Mr. A. Underwood showed models of the mouth of a young man seventeen years of age, a patient of Mr. Morris. In the upper jaw the incisors were altogether absent, the space being bounded on each side by two large canines, closely resembling dog's teeth ; the rest of the teeth were temporary, and were badly formed. In the lower jaw he had only one tooth of the second set, the right canine, which, like the upper, was very strongly developed ; the rest were all persistent temporary teeth. The patient's mother and father had perfectly natural teeth, and there was no history of any previous abnormality of this sort in the family, but his sister presented a precisely similar deformity. A case closely resembling this had been reported some years since by Mr. Moon in the Society's *Transactions*.

Mr. George Lucas (Gravesend) read notes of an interesting case of deficient dentition, which had been brought under his notice by Dr. Jones, of St. Bartholomew's Hospital, Chatham.

The patient was a well-formed young woman, twenty-two years of age, but who exhibited unmistakable signs of inherited syphilis, and who was admitted into hospital on December 11th, 1884, on account of a large ulcer on the left leg. For this she was successfully treated with twenty minim doses of Liq. Hydrarg. Perchlor. three times a day, without any salivation occurring. When first examined by Mr. Lucas, on January 28th of this year, the gums appeared almost edentulous, there being only two abnormally formed teeth; one, in the lower jaw, being not unlike a wisdom tooth, the other, in the upper, having the characteristic peg shape and occupying the position of the cuspid.

On questioning her the following particulars were elicited:—

The tooth in the lower jaw was erupted when she was eight years old; from this it might be inferred that it was an unusually small first permanent molar. The tooth in the upper jaw appeared six years later, *i.e.*, when the patient was fourteen. She stated positively that she had never had any teeth extracted, and, as far as she could remember, had never had any other teeth than these at all.

Several peculiarities in the appearance of the patient were noticed, which seemed to accord closely with the description given by others of cases of edentulous gums. A few instances were recorded, and probably others had come under the notice of members, in which a marked deficiency of teeth had been associated with almost complete alopecia. In this case, as in those referred to, the patient is almost hairless, and has been so, she says, since her birth.

Another striking peculiarity was the remarkable smallness of the jaws, which seemed to confirm the statement made by an eminent member of the Society, in his "Manual of Dental Anatomy," that the growth of the jaw depends upon the presence of the teeth.

Besides these characteristics, Mr. Lucas noticed others which were not mentioned in the published cases. The patient's face had a remarkably flattened appearance, the nasal bones being apparently wanting. Her skin also was extremely thin and tense, especially upon the lower and upper extremities.

Mr. Davis exhibited models of the mouth of a young man, aged twenty-six, showing a remarkably wide open bite; only three pairs of teeth met when the mouth was closed. The patient stated that his teeth never had met in front, but that things had been getting gradually worse. He wished to have his front teeth extracted and replaced by artificial ones, but Mr. Davis did not like to do this.

The President asked whether the patient had ever had his teeth regulated, to which Mr. Davis replied in the negative.

Mr. Hutchinson said he had made some experiments on the use of cocaine, with the object of ascertaining whether the drug was of any use for relieving the pain of extractions. He applied a pad of amadou on each side of the tooth to be extracted, dried the gum carefully, and then applied crystals of hydrochlorate of cocaine all round the tooth. The result, in about two minutes, was almost complete anæsthesia. The patient said she could feel the digging of the instrument, but felt no pain. In another case he wished to extract the buried roots of a second molar and also a bicuspid tooth. Thinking to make a good comparative experiment, he applied the crystals of cocaine to the molar roots, but not to the other. Both were, however, extracted with but little pain. He had previously found a .20 per cent. solution quite useless for preventing the pain of extractions, but with the crystals he had had considerable success. He should watch carefully to see whether any tendency to sloughing or inflammation followed their use, but he had not seen anything of the kind at present.

Mr. Morton Smale said that in a case where very great pain persisted for some time after extraction, he had tried the effect of applying a 24 per cent. solution of the hydrochlorate. It appeared to give a little, but very little relief; no inflammatory signs followed.

Mr. A. Underwood said he had applied a 20 per cent. solution to an exposed pulp, and found, after an interval of five minutes, that it had produced scarcely as much effect as carbolic acid.

The President said Mr. Brunton, of Leeds, had been good enough to send him some citrate of cocaine prepared by himself, and he (Mr. Bate) found that it had a very marked effect on sensitive dentine.

Mr. Hutchinson said Mr. Brunton had also sent him some of the citrate of cocaine, and he (Mr. Hutchinson) could confirm what the President had said with reference to its effect on sensitive dentine. He thought that in using solutions of cocaine in the mouth, the effect of the natural moisture of the cavity in diluting the strength must be taken into account. He thought that the crystals used in the mouth in the way he had described might be taken as equivalent to the application of a 50 per cent. solution. It was important in using cocaine to relieve the sensibility of dentine, that the cavity should be dried before applying it, and again dried before excavating.

President's Address.

Gentlemen,—In attempting to address you on this occasion, I must appeal to you in two separate portions: those who have received the honours of the Presidential Chair, and those who have yet to obtain that distinction—the highest mark of professional recognition that any of us can hope to attain.

The former I would ask to remember what their feelings were when this position in the Society was conferred upon them, and by their own high appreciation of the honour, to believe in mine.

The latter I would beg to pause and think what their feelings will be when the time comes for them to be elected.

And both I will ask to multiply the sense of the honour 250 times, being the amount in miles to which you have called me to fulfil the duties of President of the Odontological Society of Great Britain.

To this I will add, what I am sure you will generously accord, some forbearance for any shortcomings on my part, and you may obtain an approximate idea of my sense of your kindness for the honour you have done to me.

When in 1856 the late Mr. Arnold Rogers read a paper "On the Reduction of Limaille," he commenced the literary history of this Society, the career of which has quietly and peacefully revolutionised the practice and position of the Dental practitioner.

Before this Society was formed the members of our calling were not only scattered, but they existed in a common dread of each other. If a man had an idea in his mind that he thought was advantageous, he felt it to be his duty to keep it to himself, fearing that his neighbour might rob him of a privilege. Weak in himself, he was jealous of those around him, not being able to realise that individual progress is always slow.

It was on the 6th of November, in 1856, that a few earnest individuals from the North, South East and West of England—

and they were very few—met to commence this Society, which has done such great things in the scientific progress of our profession, by gathering knowledge from all parts of the world and presenting it open-handed to those who were desircus of learning.

When this Socity commenced, there was scarcely any knowledge of work beyond that which could be produced from gold, silver, and bone ; mineral teeth had been scarcely a decade in existence, and these were not of that strength and adaptability as to exclude the human tooth from being largely utilised.

Mechanical work was the great aim of the dentist, and to save a tooth that had pained was seldom attempted unless the dread of extraction overcame professional experience.

When this Society was once formed, communications came in quickly, and men were willing to give their experience when they found others desirous of doing the same. Thus communications were forthcoming on all subjects connected with the teeth, and these it will not be inconvenient to divide into the following, viz. : Mechanical, Anatomical (human and comparative), Physiological, and Surgical Dentistry.

As the mechanical work was thought to be of the greatest importance, it naturally followed that a paper regarding it should be among the first read, and another soon followed in which Mr. Duffe informed us that the introduction of palladium, dental alloy, and other white metals as substitutes for gold and silver, was unjustifiable, even where economy was a consideration ; that the ivory of animals was variously used, and that of the hippopotamus more nearly resembles in character human dentine than any other substance employed by dentists. Mineral teeth, as introduced by the English and American manufacturers, he compared with those of the French make, but reported that the best forms were far from perfect, being wanting in strength.

Soon followed a paper by Mr. Statham on Plate-casting. Instead of striking plates out of sheet gold, he recommended a mould being made with loam and plaster of Paris, or a composition of blacklead, into which he poured the metal, and in this manner obtained a plate of the form of the mouth, with bands or clasps in one piece ; to this he soldered the pins to carry the teeth.

This communication was followed a little time after by one from Mr. Thomson on his mode of "Striking up Plates," which was by using a machine somewhat like a guillotine, or pile-driver, the pedestal or base of which is 2 feet high, of cast iron, and weighed nearly 4 cwt.; from a cross-beam between two wrought iron pillars a hammer of 31½ lbs. descended upon the metal die and so drove it home with the most satisfactory results.

About two years after, Mr. Fox, of Gloucester, gave us his experience of an Hydraulic press for swaging gold plates. For this purpose he had a small press of at least 10 tons pressure made, and his experience justified his anticipations, it being a valuable addition to the capabilities of his workshop, taking but little room. It is simple in its work, and takes but little time,—in some cases no more than the old method,—and where it does occupy more time it is quite worth it, for the ease with which it produces a good plate. In plates for single teeth, Mr. Fox found the press of very little advantage, and in some cases preferred the hammer to the press. Thereby, I think, demonstrating that after all it is the brains behind the tool that has to do the work.

Just at this time metallurgical research introduced to our notice the power of obtaining *aluminum* in considerable quantities, and Mr. F. G. Harrington brought to the notice of this Society a mode of casting beds and palates for artificial teeth in this metal. The arguments in favour of this new metal over gold were that it possessed the property of resisting the action of all such acids as were likely to come in contact with it in the mouth; its lightness, colour, appearance, and durability. He thought that a set made with this metal would be double the value of one made with gold. The metal was said to be more easy and pleasant to work than gold, and its expense was below that of bone.

Some few months after the previous communication, Dr. Blandy, of New York, introduced to this Society his *Cheoplastic* method of mounting artificial teeth. Instead of aluminum he used a quickly melting compound, which was either type metal or something very like it. This he cast in moulds similar to Mr. Harrington's; but the great advantage that he claimed was, that his method enabled the manipulator to introduce the principle of atmospheric pressure for the purpose of retaining artificial palates in the mouth.

This method was almost immediately followed by a communication by Mr. Putman, of New York, "On the Vulcanite Base as applied to Dentistry." It is now just six-and-twenty years since this communication was read, and this was shortly followed by one by Mr. Childs "On Super-heated Steam," and another by Mr. Patrick "On Vulcanising by Dry Heat."

Small improvements in the apparatus used were continually being made, and about a year after Mr. Putman had read his paper, Mr. Dewar introduced to the Society a self-packing vulcanite apparatus somewhat similar to that which Mr. Gartrell has more recently perfected.

Gutta-percha had for several years been used in the hands of a few persons as a base, but it scarcely received the notice of the profession until Mr. Truman brought it before this Society in a communication "On the Necessity of Plasticity in Mechanical Dentistry."

These communications were the result of the first five years of the Society's existence. The second five years passed without any paper having been read that belongs to mechanical dentistry, but at the end of that time Mr. Balkwill gave us one "On the Best Form and Arrangement of Artificial Teeth for Mastication," and Mr. R. Hepburn another "On Hard Rubber," in which he states that since the reading of Mr. Putman's paper in 1861 we have been rapidly progressing in the knowledge and use of vulcanite, and we now understand its real value, and feel better able to judge in what cases it is best adapted. Year after year gives us some new, if not improved, flask or vulcaniser, and various combinations of rubber are being continually introduced, each one said to have some good and peculiar quality which it predecessor did not possess, but all revealing the large use of vulcanite, and the interest taken in it.

This communication, which was presented to the Society in 1866, reads as if it were the experience of the present day, showing how little progress in Dental mechanics has been added to our knowledge since that time, particularly in relation to "one of the greatest objections frequently urged against the use of vulcanite; I allude to the injurious effects it is said to produce upon the mucous membrane of the mouth of some patients, and even to affect their constitutions generally. It has been alleged that small ulcers, sores, and other symptoms of salivation, both local and general, have been exhibited after the use of rubber cases, resulting, it is said, from the bisulphide of mercury, or vermilion, used as a colouring agent in the manufacture. In confirmation of this it has been stated by some that the globules of mercury may be seen by the naked eye oozing from some of the rubbers supplied for our use. So far, I have not been able to detect free mercury in any of the numerous rubbers which have come under my observation. I have treated and subjected these rubbers to extreme pressure, with gold and copper foil between the layers, without being able to express any signs of mercury, or the slightest stain of it on the foil. . . . We know that bisulphide of mercury is an insoluble powder, incapable of being affected by nitric or muriatic acid, and I find no evidence to show that it can be acted upon by the secretions of the mouth, more especially when retained in combination with the hardened rubber compound."

With the discovery of vulcanite as a base for artificial teeth, it would appear that dentists imagined that research had culminated in a climax; for with the exception of the beautiful and ephemeral *celluloid*, which has been brought before the Society by Mr. Oakley Coles at one time, and later still by Mr. Hunt, of Yeovil, no fresh stride has been made in this direction.

With improvements in materials and power of working, ambition appears to be satisfied, and perhaps when Mr. Verrier has enabled us successfully to add a continuous porcelain gumwork to the vulcanite base, we shall have approached within a measurable distance of a means of attaining as perfect an artificial denture as may be practicable.

In the subject relating to the anatomy of the mouth, both comparative and human, we are not so rich as I think we might be, but those communications that we have bear the impress of research. It was early in the history of the Society that Mr. Cattlin read a paper " On the Form and Size of the Adult Antrum," from which we learn how varied is the form of that cavity, and how important it is that the operative dentist should be familiar with its relations to the neighbouring structures which he has to treat.

A year after, Mr. Mummery, who has been so recently taken from us, and whose loss we have so much to deplore, described, in three papers copiously illustrated, the Structure and Adaptation of the Teeth in the Lower Animals, and their relation to human dentition.

Dentition being coextensive with vertebrate life, and in a different character in many invertebrate forms, it is highly desirable that we, who take but one organ as a special study, should encourage a culture that embraces the entire study of the subject; for, in the words of the renowned Abernethy, "the man who confines his attention to a single object will have a mind as contracted as the object he contemplates. Knowledge of various kinds is requisite to form the true surgeon; it serves like light shining from various sources to illuminate the object of his researches." And after having directed attention to the more characteristic forms of dentition in the lower animals, the author says that apart from the rich store of intellectual gratification to be derived from the study of the infinite variety of special adaptation of structure to function, throughout the world of animal life, it serves an important end in training the observant faculties, which cannot fail to be serviceable in a profession such as ours.

Nearly six years elapsed before any purely anatomical paper, either comparative or human, again appeared, when Mr. Ibbetson read one "On the Teeth of the Fossil Fish in the Palæozoic and Mesozoic Rocks." This communication was chiefly illustrative of external form, and the quantity of the several families of fish in relation to the geological record.

This was followed, about a year later, by a paper "On the Dentition of the Mole," illustrating the development of the deciduous teeth and their relation to the permanent set, more particularly with a view to demonstrate the homology of the great double-rooted canine tooth.

This was almost immediately succeeded by a paper by Professor Owen "On the Dental Characters of Genera and Species, chiefly of fishes, from the lower main seam and shales of coal, Northumberland." In this communication the distinguished professor said that he had selected his paper "from a supplementary chapter for a second edition of his 'Odontography,' some materials not heretofore made public;" and, he added, "I feel pleasure in this opportunity of co-operating with the practical members of the Society in their purely scientific aims to establish their most useful branch of surgery on the broad basis of Hunterian physiological principles, as deduced from a survey of the modifications of dental structures and phenomena throughout the animal kingdom."

This was immediately followed by a paper by Mr. Balkwill "On the Relation between the Forms of Teeth and the Conditions of Life in Mammalia," in which the author stated that he treated the subject rather as one of mechanics than of natural history. This communication was succeeded by two papers by Dr. Murie "On some Abnormal and Diseased Dental Conditions of Animals," in which he demonstrated the relation that exists between the dentition of the inferior creatures and man—whether healthy or diseased; and he further states that "those rare cases, the red-letter ones in every dentist's experience, are where broad views come to bear, and where, as I conceive, or can not only look for, but find, in the lower animals, a clue to unravel the tangled web often wound round obscure dental changes in man."

The etiology of Dental disease requires the microscope to master it, and in the paper by Mr. Charters White, "On the Minute Anatomy of the Pulps of the Teeth," its necessity is demonstrated in the researches which induced him to determine the fibrils of the nerves of the pulp in their relation to the sensitive dentine. This was followed by some notes "On the First or Milk Dentition of the Mammalia," by Professor Flower, F.R.S., who, in concluding, said: "I think that I have shown enough to prove the importance and interest of a close study of the characters and period of the development of the milk teeth, and by showing the deficiencies of our present knowledge, to stimulate members of this Society, who may have leisure and opportunity, to contribute whatever is in their power towards a fuller elucidation of the subject."

Immediately succeeding, we have a communication by the late Professor Rolleston, F.R.S., "On the Development of the Enamel in the Teeth of Mammals," as illustrated by the various stages of growth demonstrable in the evolution of the fourth molar of a young elephant (*Elephas Indicus*), and of the incisor teeth in the fœtal calf, in which the author stated his belief that previously it had not been recorded that the enamel of the elephant's molar, as also that of the mastodon, presented the same decussating arrangement of the inner portion of its enamel which Mr. Tomes has figured as being found in some of the Rodentia, thus giving a fresh illustration to the rodent affinities of the elephant, which have been so often commented upon.

After receiving a description of an *Odontome* from Mr. Charles Tomes, as exhibited in a specimen that sprang from a small pedicle in the median groove which traverses the right lower molar of a horse, in which there was neither dentine nor enamel visible, but only a convoluted mass of cementum, we get a paper by Mr.

Henry Moon "On Irregular and Defective Tooth Development," in which he says that the Dental irregularities of excess and defect might have light thrown on them by being considered together with the normal architecture of the teeth.

The fact that the crowns of the human teeth are formed around a single dentinal system seems to have prevented the full recognition of the fact that the variety of form in the several classes of teeth is due to a multiplication and modification of a simple and elementary tooth form. These elementary forms appear to re-assert their autonomy under disturbed conditions of development. One of these denticles is shown to us in the most common and simple of supernumeraries, consisting of a conical crown and tap root. When we remember that the typical form of these supernumerary teeth closely resembles, both in structure and form, those of the cetacean type, where the earliest compound tooth is shown in the fœtal whale in Professor Owen's "Odontography," where two germs are seen to unite in one sac, I think that the study of these rudimentary representations of lost organs would form an interesting and important chapter in the history of evolution, that would fully compensate for a close and persistent investigation.

In a communication "On some Forms of Dentine Calcification and their bearing on Dental Pathology," Mr. Charles Tomes has shown how valuable and instructive is the study of the Dental tissues of animals in relation to diseases and changes in the human teeth, when read by the light of an observant mind. He compared the Mammalian dentine with the vaso-dentine, the plici-dentine, and osteo-dentine, as seen in fish, and the globular dentine as seen in the pulp of various animals, and which differs more in size than kind from calcospherites, which can be artificially produced.

It would seem, then, that we may place these several forms of calcification of dentine pulps in a scale, passing from hard dentine as the highest, through vaso-dentine and osteo-dentine to globular dentine as the lowest and least specialised. Thus the tissues produced as morbid structure are normal tissues in certain other teeth.

In May of the same year, Mr. Hilditch Harding furnished a paper "On the Absorption of Bone and Tooth Structure," and twelve months afterwards Mr. Arthur Underwood furnished one " On the Functions of the Nerves of Taste," in which he arrived at the conclusion that the glosso-pharyngeal nerve presided over the whole sense of taste, both at the root and over the tip and sides of the tongue, and that it is the only nerve of taste, and that the second and third divisions of the fifth pair have as little to do with this sense as the first division has to do with the sense of sight.

With the exception of notes by Professor Flower, F.R.S., " On the Specimens of Abnormal Dentition in the Collection in the Museum of the Royal College of Surgeons," and which was communicated to promote the scientific consideration of the subject connected with the profession, no paper on the anatomy or physiology pertaining to the organs of the mouth appears to have been communicated to the Society until 1883, a period of four years, when Mr. Bland Sutton, the senior Demonstrator of Anatomy at Middlesex Hospital, read one " On the Development of the Inferior Maxilla." In this communication the author contends that the several bones which go to build up the compound jaw of fish are represented in the simple bone of the Mammalia, and concludes that actual observation, reinforced by the application of theory, and rendered more than probable by the appeal to comparative anatomy, support the view of the compound nature of man's inferior maxilla.

A year later we find the same author giving the Society the benefit of his observations in " Comparative Dental Pathology." He not only demonstrated the existence of odontomes, alveolar abscess, and constitutional disease in animals, but produced also the evidence of some inflammatory and ulcerative process in the original formative pulp of the tooth of a fossil horse. His communication also demonstrated the causes that induced defective palates, as shown by Professor Paul Albrecht, and his own reason for not accepting the duplicity of the centres of each incisive bone, and argues that " too great a protest cannot be raised against a practice now getting prevalent—of drawing conclusions as to morphology from pathological specimens."

While referring with pride to the tone and character of the papers on Dental Anatomy and Pathology that have been brought before this Society, we cannot help noticing that the greatest advancement of knowledge has been made directly in the line for which the Society was formed, that is, in the progress of Dental Surgery. And it is a curious and remarkable fact that, with the exception of a paper by Mr. T. A. Rogers "On Capping the Exposed Nerve," no communication on the treatment of the pulp with a view to the preservation of the tooth was brought before the Society until July, 1860, or nearly four years after it was formed.

Undoubtedly we had papers of interest to the Dental surgeon in many forms :—" An Account of an Inverted Tooth and its consequences," by Mr. Tomes ; " The Reunion of Teeth with the Alveolus," by Mr. Woodhouse ; " On Lateral Pressure," by Mr. Bridgman ; " On Appliances for Reducing Irregularities of the Teeth," by Mr. Ritchie ; " On Inflammation as it appears in the Mouth, and its Treatment," by Mr. E. Sercombe ; and others of more or less importance, but all of value, as they conduce to build up the profession we follow, as the lumps of forgotten food the child devours go to form the man.

I said that it was nearly four years after the inauguration of this Society before the first communication on the treatment of the pulp after it had become inflamed, in order to preserve the tooth, was read. Nor is this a thing to be wondered at. Did I not say on commencement that we then knew but little, and that little we were afraid to communicate? Remember the state of Dental surgery then.

The old key was struggling hard to retain its existence as a surgical instrument. It was only in 1846 that Mr. Tomes communicated to the *Medical Gazette* the character of the forceps that have since been in use. The discussion between microscopists as to whether the dentine was penetrated by a system of tubuli or supported by fibres was rather suspended by the early death of Mr. Nasmyth than set at rest by accurate demonstration, and could not be said to have been determined until Mr. Tomes published his communication in the *Philosophical Transactions* of the Royal Society in 1866. With this knowledge a new generation commences whose professional education gives them power to observe and courage to think.

In 1860 Mr. Belisario sent us from the Antipodes his experience in performing the operations of Rhizodontrophy on teeth after the pulp had become inflamed and suppuration had been set up, with the valuable and important result that an examination made some months after by the cautious introduction of a drill into the cavity, "which came into contact with solid substance, without producing the slightest uneasiness on pressure," clearly indicated that the pulp had calcified.

This communication was shortly followed by one from Mr. Coleman "On the Method of Treating the Dental Pulp with a view to Produce Calcification."

His plan of treatment was the application of a strong solution of tannin in ether, and over this cotton and mastich. The result was, that in fourteen days from the commencement he cut away the tooth in the direction of the pulp cavity. "After removing a substance of the consistency of leather, and more resembling it than anything else, the outline of the pulp cavity was exposed, which was filled with a mass of fawn-coloured dentine, of a consistency somewhat harder than horn." He further adds, that the plan of treatment adopted is the one he almost universally pursues, as he believes that a tooth suddenly cut off from the supply of blood which enters it through its fangs is also liable to become necrosed; he therefore deems it of great importance to preserve as much of the dental pulp as possible.

This was followed at the next meeting by a paper by Mr. Samuel Cartwright, giving his experience "On Disease and Treatment of the Pulp." For the reduction of inflammation he advocated a solution of tannin, and for the relief of pain where suppuration had intervened, he told us of the value of the process of Rhizodontrophy. "I have," he said, "within the last three or four months, treated numerous teeth in this manner, and in every instance relief within a short time has been afforded." But he further adds, "So many cases occur in practice, where from circumstances it is not possible to undertake a course of treatment which will secure a probably successful filling." "Under such circumstances the operation enables us to fill a tooth, with reasonable conviction that after-inflammatory action will not take place." And adds in a note, with the candour of a true man of science, "that he had afterwards an opportunity of seeing some of the cases that may be pronounced successful, though it cannot be said that the teeth were always comfortable."

We shortly find that Dr. Belisario advocates in the treatment of diseases of the pulp, particularly in those cases where suppuration had not supervened, and a certain amount of disorganised dentine existed, the use of Tr. Ferri Mur., sealing it in, and occasionally renewing it, and when the tenderness had subsided filling the tooth with gutta-percha and tannin, and under ordinary circumstances, in from six weeks to three months, the disorganised tissue has become hardened, from a deposition of the salts of lime.

Shortly after, Mr. Thos. A. Rogers gave, under the title of "Fang-filling," his experience on the destruction and removal of the pulp, and advocated that the organ to be treated should be as largely exposed as possible, that the formula employed should be—arsenious acid three parts, acetate of morphia two, and creosote sufficient to form a thick creamy paste; a small portion of this paste should be taken on the point of an instrument and gently placed upon the exposed pulp so as to cover every part of it, and over it a gold cap should be placed, and secured by a temporary plug of wool and mastich or wax, or osteo-cement. This he retained in position from forty-eight to ninety-six hours, according to the condition of person or tooth; it then may be removed, and if the patient could not bear the operation immediately, he applied creosote daily from a week to a fortnight before removing the pulp, after which he treated the cavity daily until it was in a condition to receive a filling of gold foil. He illustrated his practice by describing seventeen cases, all of which were more or less successful excepting one.

Soon after this, Mr. Woodhouse introduced to the Society the value of carbolic acid in its purer state, and a paper was read on the treatment of the pulp, with a view to its preservation by the means of this antiseptic, by Mr. James Bate, and another by Mr. Ashley Barrett, who thinks that "a great step has been made in Dental pathology, now that we are able to assert with confidence that, wherever any signs of inflammation outside the tooth are present, they are caused by putrefaction going on within; that a tooth is never tender on pressure or tapping without containing a putrefied pulp, and that a gumboil is evidence of chronic periodontitis, which latter is caused by an escape from the tooth of particles of decomposed nerve," his object being, he said, to advocate the utility of carbolic acid, in firstly preventing putrefaction of the dental pulp, after its being devitalised by arsenic, and secondly in arresting putrefaction of the dental pulp when once established, and so directly curing periodontitis. These assertions of the author were canvassed in discussion, and afterwards considerably modified by him.

At the succeeding meeting, Dr. Walker followed the subject with a communication "On Treatment and Extraction of the Tooth Pulp." His treatment was to dress the pulp with thoroughly levigated arsenic, creosote, and morphia, on cotton wool, and retaining it for twenty-four hours by a temporary stopping, when it should be removed and replaced by a plug of wool, the base of which should be saturated with a solution of mastic, and the apex tipped with fifteen granales of tannic acid and one-tenth of a grain of acetate of morphia. When suppuration has set in, the cavity should be well sponged with solution of carbolic acid, and in forty-eight hours a barbed instrument may be inserted for the extirpation of the pulp, after which he forces creosote by means of a fine steel rod enveloped in wool, using it as the piston of a syringe, repeating the operation until the fluid passes through the sinus of the alveolar process at the apex of the fang, finally clearing the canal with wool and pure spirits; and in the course of discussion, Dr. Walker attributed the power of extracting the pulp whole to the influence of the second dressing of tannic acid.

This was followed by a communication from Mr. G. D. Pollock, President of the Pathological Society of London, "On Alveolar Abscess dependent on Diseased Teeth," in which he gave a series of cases in which the eye, nose, antrum, or neck had become involved with a carious tooth; and he came to the conclusion that in all instances of abcess or ulcer in the upper or lower maxillary regions, in certain cases of discharge from the nostrils, or in pains about the orbits with defective teeth in the jaws, it is always best at once to have recourse to their removal; acting on the principle that it is best to clear away any doubtful point in the treatment of a case before recourse is had to any other measures. This opinion being generally protested against by the members present, Mr. Pollock said that he looked at teeth merely as a surgeon, and did not think them of so much value as many of them apparently did, and that perhaps he should modify his practice a little, and have the teeth sometimes treated instead of having them extracted.

In a communication "On Nervous Diseases connected with the Teeth," Dr. Lauder Brunton, F.R.S., after describing many instructive and interesting cases in which various forms of disease were cured by the direct treatment of the teeth, remarks that "affections of the intestinal track depending on dental irritation are of very considerable importance indeed." "The close connection between the roots of the fifth nerve, and those of the vagus, can be demonstrated anatomically, and it is probably in consequence of this that irritation of the fifth is able to exert such a powerful influence upon the circulation;" and further continues, "We have now seen how affections of sensation, of motion, and of nutrition may all be dependent upon dental irritation, but even the cerebral faculties themselves may also suffer from a similar cause," of which he gave several striking instances in corroboration of his assertion. And still more recently there is a paper by Mr. Power, Ophthalmic Surgeon at St. Bartholomew's Hospital, "On the Relations between Dental Lesions and Diseases of the Eye." In the course of this communication he says, "The influence of dental lesions on the accommodation has been particularly investigated by Dr. Herman Schmidt, of Berlin. This observer examined the eyes of ninety-two patients, who presented themselves at his clinic, suffering from some sort of dental disease—such, for example, as caries, periostitis, or neuralgia. Amongst the ninety-two cases, Schmidt found there were only nineteen in which the range of accommodation was normal; in the remaining seventy-three cases the range was lowered, and in most instances considerably reduced."

In regard to the locality of the dental lesion; in forty-one cases in which the upper maxilla was affected, paresis of accommodation was observed seventeen times. In thirty-nine cases in which the lower jaw was affected, the paresis was observed nineteen times. Disease of the teeth of the lower jaw, therefore, appeared to be somewhat more effective in producing failure of accommodation than that of the upper jaw. And he concludes, "I think it may be laid down as a maxim to be generally observed, that in all cases of threatening glaucoma, especially when this is associated with ciliary neurosis, and obscure pains in the temples and maxillary orbital regions—in all cases of mydriasis, and probably myosis, originating without apparent causes—in all cases of sudden paralysis of either of the orbital muscles, or of loss of sensation in the absence of cerebral symptoms—in all cases of phlyctenular disease of the conjunctiva—in all ulcers of the cornea resisting ordinary treatment—in all cases of sudden failure of accommodation, especially in young children—and finally, in cases of exophthalmia, the condition of the teeth should at least be examined, and if faulty conditions present themselves, these should be rectified, and then one at least of the possible causes of each of these diseases will be removed."

Time will not admit of our even mentioning one-half the work that has been done, or discussing such important subjects as the replantation and transplantation of teeth, which has been introduced to our notice by Mr. Woodhouse, Dr. Magitot, and Mr. Coleman, or more than to draw attention to such valuable contributions as those of Mr. Oakley Coles, "On the Production of Articulate Sound," and of Dr. Langdon Down, late Resident Physician of Earlswood Asylum, "On the Relation of the Teeth and Mouth to Mental Diseases."

To review the progress that has been made in the recent manner of introducing gold and other fillings, together with the use of the rubber dam, which has completely revolutionised our practice and operations would require a chapter in itself even to record the work that has been done.

Our knowledge of Dental caries has, through the researches of Messrs. Milles and Underwood, undergone an investigation that we sincerely trust will shortly lead to a conclusive demonstration of its true character.

Within the period of the Society's history anæsthetics have undergone considerable investigation, and if not for nothing else the value of this addition to surgical operations ought to make the name of dentist popular, the full advantage of which we may not be entitled to until we have discovered the means of obtunding pain in acutely sensitive dentine, which I trust the citrate of cocaine is about to bring us, a circumstance that will render our operations both more certain and less disagreeable.

In glancing through the several volumes of reports, I think that the Society has cause to congratulate itself upon the position that it has taken among the professional and scientific bodies.

That persons have come from the Continent of America and the Antipodes being students in our speciality is a favour that was not beyond the reach of our hopes, but when we find that men of world-wide renown, such as Professors Owen, Rolleston, Flower, and Murie, have sent us their researches on subjects relating to our studies, and that men like Power, Down, Brunton, Pollock, Hutchinson, and Richardson have made this Society the medium of their professional experience, we feel that the Society has a duty to fulfil and a reputation to preserve, which, with your co-operation and assistance, I sincerely hope will be both upheld and advanced during the time I have the honour of presiding over it.

ODONTO-CHIRURGICAL SOCIETY.

The fourth ordinary meeting of this session was held on February 12th, at 30, Chambers Street, Edinburgh, Mr. Andrew Wilson, L.D.S. Edin., President, in the chair.

The President announced that the discussion upon Mr. Stirling's paper on "The Treatment and Filling of the Nerve Canals in Teeth," as read at the last meeting (see page 62), would then take place, and called upon the Secretary to read a communication he had received upon the subject from Mr. Watson, who wrote:—I think on the whole the treatment of such cases as recommended by Mr. Stirling is very thorough; at the same time I take exception to some of the things said in his paper. He says he does not remove the pulp after devitalising until four weeks after; this I think entails a great liability to periodontinal trouble. It is much better to remove the necrosed pulp at once, or in three or four days at most, after having dressed it with tannin and glycerine. We are cautioned not to use too much force in syringing out with water the canals of teeth, as it might force septic material through their apices; this I do not see the possibility of doing, unless the point of the syringe were fixed into the canal by means of cotton wool soaked in sandarach varnish. Mr. S. also recommends the application of hot fomentations to the face to promote suppuration. The old-fashioned treatment, a roasted fig split and applied to the labial and lingual surfaces of the gum over the affected tooth, is both safer and better, or the application of capsicum bags to the gum over the root of the tooth. Mr. S. does not make mention of that useful drug in such cases, viz., calcium sulphide, which has such a beneficial effect in promoting the absorption of inflammatory exudations, and in retarding their formation when used at an early enough stage. I do not quite agree with Mr. S. in cutting away so much good tissue in the treatment of posterior approximal cavities, preferring the treatment advocated in my paper on alveolar abscess, read before the Society some two years ago, viz., filling loosely the pulp chamber with cotton wool, and them filling the posterior approximal cavity with amalgam or other stopping, and the next day drilling a good large hole right through the centre of crowns of teeth. By this means direct access can be obtained to the canals, making the treatment much easier and more thorough. Mr. S. condemns root filling with cotton wool and antiseptics. I, on the other hand, uphold this treatment as preferable to the other, in respect that if anything goes wrong with the tooth, the cotton wool root filling can be removed, whereas in the other case it is almost impossible to remove the cement; at the same time I may say I only fill the root, or roots, with cotton or silk, and antiseptics, the main portion of pulp cavity being filled with cement.

Mr. Macgregor said: I have one remark to make—I find that none of the previous speakers have mentioned a mode of treating acute periostitis condemned by Mr. Stirling, but which I have occasionly found beneficial—namely, that of applying a leech to the gum. I may mention a case in point. A gentleman from the country called upon me last week, complaining of pain in a tooth stopped some six years ago, which then gave me some considerable trouble. I applied the usual remedies at that time, and told him what to do should the tooth continue to pain him. He came in this week, and as it had lately become so troublesome as to prevent him from getting any rest, he wished me to extract it unless I could give him relief by any other means. As he could not well afford to lose the tooth, I thought I would see what benefit could be derived from grinding it down, so as to free it from pressure against its opponent in the opposite jaw, but this gave no relief; I then applied a leech, and although it itself drew but little blood from the gum, a good deal flowed afterwards from the wound. Before leaving to catch his train he told me that the tooth felt more comfortable than it had done since the attack, but if there were a return of the pain he would come and have the offender removed; and as that was now four days ago, I presume the trouble has subsided.

Mr. Campbell disapproved of the practice recommended by Mr. Stirling of leaving the devitalized pulp for four or five weeks before filling the roots. He believed the nerve instruments, such as Mr. Stirling made and used, would be likely to cause considerably more pain, should there be vitality in any part of the nerve, than such instruments as Morey's nerve canal drills, which he (Mr. Campbell) made use of. Mr. Stirling's nerve instruments are round, and held in the hand, rotation being necessarily slow, whereas the Morey's nerve drill (not for enlarging the canal) being augur-shaped and rotated by the engine, does its work quickly, and should there be vitality about the apex, it is destroyed in an instant. In most cases Mr. Campbell applied the rubber-dam, as he invariably extracted the pulp and filled the tooth "right away."

After the cavity of decay had been prepared, and ready to have the soft tissues taken from the canals, he invariably saturated the cavity with sulphuric ether before using the Morey drill to clear out the canals, in case there might be some vitality still remaining about the pulp.

He believed sulphuric ether to be the best local anæsthetic we had, except cocaine, of which he could not yet speak. He also used ether for obtunding sensitive dentine with considerable benefit, and recommended members to give it a trial.

Mr. Campbell could not understand why Mr. Stirling so undervalued the teeth of patients who "had reached the shady side of middle life." Surely they are as valuable, and certainly more amenable to treatment in periosititis, namely, freeing the tooth from pressure by cutting the antagonising tooth. Mr. Campbell quite agreed with Mr. Macgregor; he also had often found great benefit from the application of a leech to the gums.

Mr. Macleod said that in connection with Mr. Stirling's remarks on the opening of canals by drilling, he had a bicuspid to show, which would illustrate the great danger which attended that operation at all times, and more so in teeth posterior to the incisors. This specimen was a second bicuspid upper left with a distal cavity. The dentist in this case had succeeded so well that he had drilled right through the cementum, and the alveolar septum separating the two bicuspids, and judging from the quantity of silk thread which was found protruding from the drill hole, he must have been impressed with the conviction that he was getting this canal thoroughly filled any way. In the case of bicuspids, it is frequently impossible to enlarge the canals by drilling, owing to the thinness of the wall at the centre of the approximo-distal section of this hour-glass or figure-eight-shaped canal.

Mr. E. Cormack said that he did not think it advantageous to leave a pulp, after being treated with arsenic for a month, because when for any reason he had done so, he had as a rule found that the root canals were filled with a sanious fluid, which was only got rid of with great difficulty. He considered that few pulps were removable within forty-eight hours, except with pain more or less acute. Dr. Walker's treatment of following up the application of arsenic, with carbolic and tannic acids, was a decided improvement on the old plan, but in his (Mr. Cormack's) hands, the removal could not be effected so quickly and painlessly as Dr. Walker would lead us to expect. He agreed with Mr. Stirling that the opening up of canals with drills or broaches was not a course to be commended; in fact, by this treatment, he was inclined to believe much harm might result. Mr. Macleod had just handed round a bicuspid through the root of which a drill had been passed some time ago; he (Mr. Cormack), had extracted an upper molar tooth, in which three roots were perforated in a similar manner. In order to freely expose a diseased pulp, he was in the habit of applying to the dead bone covering it a paste (lately recommended by an American dentist in the *Cosmos*) consisting of carbolized resin and caustic potash, to lessen the pain of piercing the diseased pulp; this at first is apt to cause a sharp twinge of pain, which, however, soon passes off, and allows the operator to gently scrape the dentine away till the pulp is exposed. Owing to the irritating nature of the agents used, the surrounding parts must be protected by the coffer dam. In the event of any gangrenous matter lurking about the canals, a solution of corrosive sublimate (1-1000) applied without force, and then followed by loosely rolled pellets of cotton wool, with carbolic and tannic acids, are often sufficient to bring about a cure, and for a permanent filling, cotton wool with white stopping entangled in its meshes, is at once easy and effective. Mr. Cormack concluded by saying that he did not think that Mr. Stirling's scruples as to the extraction of a tooth affected by acute periostitis would be generally shared by the members of the profession; and for his own part, he thought that the recommendation to apply a hot cloth over the cheek might be more likely to produce graver results than that following the pointing of an alveolar abscess internally. In hospital practice it was not uncommon to see facial disfigurement caused by a too rigid adherence to the procedure.

Mr. Amoore said that he thought that from what he had heard on this and other occasions from diflerent operators, that the pain caused by the removal of a nerve, even after its treatment with arsenic, was often underrated; truly it was momentary, and its intensity varied immensely in different individuals, according to their temperament and susceptibility to pain. If he might take himself as an average example, in one molar the nerves had been extracted from the three roots after a week had been allowed to elapse, subsequently to the application of the arsenic, in another upper molar the same had been effected after two applications of arsenic, extending over a month. Both operations were painful, and in the first instance, as each nerve was being removed, the pain could be felt flashing up the side of the face, over the eye; in the second it was less acute. He had often been assured by operators that "the way they did it" never, or only rarely, caused pain, at all events, none to speak of, but he was inclined to think that in these instances the suffering occasioned was underrated, that is, if the operation had been thoroughly performed, and the nerve divided at the apex of the root. It was his experience that there was always more or less pain, though at times but slight. He had not given Dr. Walker's plan a fair trial perhaps, but so far as his experiences went, they coincided with those of Mr. E. A. Cormack; the theory was good, but the results were disappointing. He approved of what had been said condemning the practice of enlarging the pulp canals with burrs, flexible or otherwise; it was a risky practice, and in his opinion, unnecessary, as by such a method as described by Mr. Stirling, or a variety of the same, the canals could be filled quite well without it. He had formerly been in the habit of filling the roots with antisepticised wool, but had for some time past impregnated it with thin oxychloride, and he thought with better results, and to judge from those obtained by others, he was strongly in favour of some non-absorbent material, and he knew of none better than Guillois's cement, as recommended by Mr. Stirling.

Mr. Mackintosh, in referring to what had been said by Mr. Amoore, called attention to the February number of the *Dental Record*, in which it was stated that a few drops of hydrochlorate of cocaine in water, after being allowed to remain for a few minutes in the cavity of a tooth upon an exposed pulp, made it insensible, and allowed its removal without pain. In another case eight drops of a solution of similar strength, when injected beneath the buccal mucous membrane in close proximity to the mental foramen, caused anæsthesia of the lower lip molar canine and incisor teeth, and partial anæsthesia of the tongue on that side.

Mr. Rees Price decidedly could not agree with the author of the paper with respect to the non-extraction of a tooth in a state of acute periostitis, with impending suppuration. He had found marked relief in giving internally sulphide of calcium in cases of periostitis, or tendency to alveolar abscess. He thought Mr. Stirling was too ready to cut away the buccal walls of teeth to get at the pulp cavity; it was more advisable to open up from the crown. Possibly the instruments used being made from stocking needles bent at different angles, and filed to a tapering point, had something to do with this; they seem too brittle and not flexible enough. Donaldson's nerve bristles were preferable. He could not agree with Mr. Stirling in the necessity for leaving a pulp cavity intact for a month after the arsenic had done its work. Some pulps were difficult to extirpate even with two or three applications of arsenic, but if the pulp had been acted upon he found, as a rule, it could be removed in 48 hours, and the tooth filled permanently, with little or no inconvenience to the patient. Mr. Watson had said that leaving arsenic upon an exposed pulp for a long time was likely to cause periostitis. He must dissent from this statement; for not unfrequently, from necessity, he had applied arsenic to exposed pulps, and finishing with a temporary stopping, he had not seen the patient for a long time. Mr. Coleman had suggested using arsenic as a dressing in dead teeth, under certain circumstances. He had tried this on many teeth—especially when it was not possible for the patient to give the time for prolonged treatment, and with satisfactory results.

The President closed the discussion by remarking that the subject had been so thoroughly wrought out by the previous speakers that here was nothing left to say. He quite agreed with Mr. Macgregor as to the very great value of leeching in acute periostitis.

As regarded the antiseptic powers of arsenious acid, he recollected having many years ago (when its use dentally was only beginning) seen it stated in an American journal that pulps devitalised by its means could never become putrid.

CASES OF INTEREST.

Mr. Rees Price showed a model of the upper jaw of a boy, aged 11. The two central incisors were ½ an inch in breadth. The laterals were in position, and the canines were coming through. One of the central incisors was chipped at the cutting edge, where it was very thin. It also showed a deep furrow on the lingual surface, giving the semblance of a union of two teeth.

The President exhibited the skull of a very young camel, showing the temporary dentition. The members, he said, would observe that neither upper nor under canines were caniniform, and that the lower one formed quite as much a continuance of the incisor group as did the corresponding tooth in the permanent series of the *Bovidæ*.

Mr. Macleod exhibited a lower incisor, to which was attached a very large deposit of tartar.

The next meeting of the Society, being the Annual one, will be held on the afternoon of Friday, the 13th March, and the Annual Dinner on the evening of the same day.

NATIONAL DENTAL HOSPITAL.

THE Annual Meeting was held at the Hospital on 23rd February, 1885, Lord Viscount Enfield, President, in the chair.

The Committee of Management submitted their twenty-third annual report. They are very pleased at being able to state that they consider the progress of the Hospital during 1884 to have been satisfactory.

The year 1883 was specially marked by the Committee being able to raise over £500, by the offer of half that sum, from the Dowager Lady Howard de Walden, on the condition of their raising the remainder. Last year no such liberal offer was received, and consequently the receipts fell off, but the Committee have great satisfaction in stating that the receipts for the year are still in advance of those for 1882, *i.e.* for the last year not specially marked by such liberal donations. The receipts amounted to £709 18s. 9d., and the expenditure to £603 5s. 8d.

The balance sheet shows one feature which the Committee think gives great cause for congratulation, and that is, that the contributions from patients amount to no less than two-thirds of the total receipts. This is a very satisfactory proof of the value the poorer classes attach to the Hospital, and one which the Committee think ought to influence more generous assistance from the public who are now crying out so much against entirely gratuitous Hospital treatment.

The Committee regret that they have not met with sufficient support to be enabled to claim the kind promise of £200 from Miss Smith, on the condition of £1,800 more being raised to form an Endowment Fund for the Hospital.

A suggestion was made early in the year that a series of subscription dances should be held in aid of the Hospital, and the Committee, after due consideration, decided that four should be held at the Marlborough Rooms, Regent Street, as an experiment. The Committee wish to tender their sincere thanks to all the ladies and gentlemen who so kindly consented to become patronesses and stewards of the dances, and worked so hard for the disposal of tickets. The Committee assure them that on every side they have received congratulations upon the manner in which the dances were conducted, and the enjoyment which they gave. The Committee, however, find that the financial gain was small, but still they recommend a further series.

THE REPORT OF THE MEDICAL COMMITTEE states that the yearly number of both patients and cases has increased: 1884 was no exception to the rule, as the following statement of operations will show:—

ANNUAL STATEMENT OF OPERATIONS PERFORMED FROM JANUARY 1st, 1884 TO DECEMBER 31st, 1884.

Number of Patients attended		19,281
Extractions.	Children under 14	5,372
	Adults	11,363
	Under Nitrous Oxide	4,353
Gold Stoppings		847
Other Stoppings		5,014
Advice and Scaling		2,942
Irregularities of the Teeth		1,368
Miscellaneous		1,893
	Total	33,152

These totals show an increase of 1,438 patients, and 5,905 cases over those for 1883.

The changes in the Medical Staff have again been confined to the posts of House Surgeon and Assistant House Surgeon.

The appointment of Dr. Winslow as Anæsthetist to the Hospital in 1883, has proved of such value that the Committee have recommended the appointment of three other gentlemen as Anæsthetists, and they are happy to be able to report that they have secured the valuable services of Mr. W. Tyrrell, Mr. Hewitt, and Mr. Glassington. The large increase of 1,807 cases of operations under nitrous oxide led the Committee to believe that the poorer classes appreciate this addition to the efficiency of the Hospital.

Many requests have again been received for the Advice Cards, which have in many instances acted as patterns for other Institutions to use; and the Committee also notice that more Subscribers

Tickets have been used during 1884 for gas and gold fillings than during any previous year. The Hospital Saturday Fund have on two different occasions applied for a further supply of tickets.

The Committee have decided upon offering one Free Scholarship annually tenable for two years, such nomination being at the discretion of the Committee of Management of the Dental Benevolent Fund. It is to provide the dental education at the National Dental Hospital and College for the son of a deceased, or sick registered dental practitioner, whose professional education shall have been commenced prior to such application to the Fund.

The Committee regret that the smallness of the funds at the Managing Committee's disposal still prevents their enlarging the Waiting and Extraction Rooms, which are at times most inconveniently crowded, but they trust that it will not be long before the benevolence of the public will allow of those very desirable alterations being effected.

EDINBURGH DENTAL HOSPITAL.

The Annual Meeting of this institution was held on the 29th of January in the Hospital buildings, Chambers Street—Bailie Anderson presiding. The report stated that the popularity and usefulness of the institution were increasing year by year. Last year the number of patients treated was 6,279, of whom 3,163 were males and 3,116 females. This was an increase of 681 on the number in the previous year. In consequence of this increase the Dental staff had had forced on them the necessity of acquiring larger accommodation, the present premises being too small and inconvenient for the thorough and efficient discharge of the increasing demands upon the resources of the institution. The staff, therefore, suggested the advisability of appointing an administrative committee to make the necessary inquiries, with a view to having the hospital located in a new building. An increase in the voluntary subscriptions made by poor patients continued to show their appreciation of the benefits conferred upon them by the institution. The usefulness of the hospital in educating the dentists of the future was also becoming more and more apparent; while the facilities given to medical students were largely taken advantage of, especially by those who were looking to the navy or army as their future sphere of practice.

The Chairman, in moving the adoption of the report, remarked that though the Dental Hospital might be said to be in its infancy, it would have been scarcely possible to present a more satisfactory statement of the year's work. The fact that there had been more patients was, he thought, an indication not only of the great good the hospital was doing in the community, but of the benefits which it was prepared to confer on a much larger number of their poor and suffering fellow-citizens. It had prospered so well that new buildings were now required. The dentist's profession, like all others, was growing in importance, and the necessity of a thorough and scientific training and education could not be gainsaid. He thought it a hopeful sign that science now directed its attention not so much to the curing of evils as to the prevention of them—not so much to the extracting of their teeth as to the preserving of those they possessed.

Dr. Littlejohn testified to the benefits conferred upon the poor by the institution, and said he would bring before the committees of the Colleges in Edinburgh the fact that medical students had here the means of getting that scientific knowledge in Dental matters which they required.

Mr. W. Bowman Macleod, treasurer, stated that the income during the year amounted to £346 12s. 4½d., and the expenditure to £347 19s. 1½d., leaving a balance of £1 6s. 9d. due to the treasurer. The funds at the credit of the hospital amounted, however, to £249, an improvement to the extent of about £30 on those of the previous year. A vote of thanks to the chairman closed the proceedings.

JOURNALISTIC SUMMARY.

THE INDEPENDENT PRACTITIONER. *(January, NEW YORK.)*

"Rough Enamel," by Dr. C. E. Francis. About eighteen years ago a gentleman brought his son, a lad of twelve years, who possessed a set of teeth about as ill-looking as it is possible to imagine. The entire surface of enamel was but a tissue of serrations and pits, and, coated as they were by dark-colored accumulations, he presented a most repulsive appearance. Said the father, "They are the worst looking teeth I ever beheld, and it pains me to look at them. Can anything be done to improve them, or must they be extracted?" After due examination the following advice was imparted: "If the lad was my son I would plane down the surfaces of his teeth and polish as smoothly as possible." "Very well," was the rejoinder; "do for him as if he was your child." So with broad, sharp chisels and files, the rough surfaces were cut away, and with sticks of Superior-stone and powdered pumice were polished quite smoothly. A few pits, here and there, penetrated the dentine, and were carefully filled with gold.

The result proved a complete success, and from that time they have remained whole and clean.

Another case was that of a youth of fifteen summers, with superior incisors much eroded, their entire labial surfaces roughened by acidulated secretions. The teeth were somewhat stained and a little sensitive. The surfaces were smoothed with fine corundum wheels, and polished with corrugated rubber discs charged with finely-ground Arkansas stone. For three years they have kept splendidly, are bright and clean, and present a far better lustre than in their original or normal condition.

With the above, and many other similar experiences as a guide, I would not hesitate to cut away and polish rough enamel.

"COMBINATION OF THE NAPKIN AND THE RUBBER DAM," by Dr. B. M. Wilkeson. For filling the superior teeth, when it is not desirable to use the rubber dam in the usual way, but it is important to keep the napkin dry, I find it an admirable plan to place the napkin upon a sheet of rubber dam, with the latter projecting about half-an-inch beyond the edge of the former. I then pass each under the teeth to be filled, and hold them in the same manner as when the napkin alone is used. In this way the napkin will be kept thoroughly dry, which will enable the Dentist to perform his operations with great satisfaction.

A little experience in the use of this combination will prove particularly valuable to those who use soft gold and amalgam, as well as all other filling materials. The advantages which I have derived in this method are: It saves much valuable time that would otherwise be spent in adjusting the dam in the usual manner; it protects the napkin from moisture, which would be absorbed from the secretions in the lower part of the mouth; the napkin throws more light into the cavities to be filled than would the dam alone, and the gold is not so liable to drag on the linen as on the rubber; the two are more readily held in position than would the rubber alone.

This combination may not be new to all, nevertheless I have never heard of any other operator using it; therefore, as far as I know, it is original with me, and I publish the discovery, not as a revolution, but in order that others may reap the benefit.

OHIO STATE JOURNAL OF DENTAL SCIENCE. *(December, OHIO)*

INTRODUCTORY LECTURE of the 39th Session of the Ohio College of Dental Surgery, by Professor J. S. Cassidy. Having glanced at the high sphere of human activity of the ancients and the progress of alchemy, the lecturer alluded to physical science as it is to-day.

"THE NUTRITIVE FUNCTIONS," by Dr. A. T. Douds. The dentinal tubuli, opening into the pulp chamber, and radiating throughout the entire substance of the dentine, furnish a most admirable system of conduit for the conveyance of nutritive matter, and that such movement of nutrient fluid actually occurs, reference is made to the well-known gradual tinging of the teeth of animals from feeding madder.

The inter-tubular tissue, when highly magnified, is seen to be made up of minute granules closely united together through the medium of the organic constituents of the dentine; and it was Kolliker, if we are not mistaken, who first called attention to what he termed "inter-globular spaces," which he regarded as sustaining the same relation to the dentine, that the lacunæ do to the nutrition of bone. The tubuli he describes as opening into these spaces.

"The more active the normal nutrition of any tissue, the more speedily does its molecular death follow the withdrawal of the conditions upon which its vital action depends."

In the application of the converse of this statement to the dental tissues, certain physical phenomena are manifested synonymously with any interference with their normal nutrition, which, acting externally and in concert with the interstitial disintegration, results in the rapid breaking down of the teeth, the external influence being due, *indirectly*, to the vitiated condition of the oral secretions—farther facilitated by the structural defects or peculiarities referred to—and induced by nervous depression, the result of disease or exhaustion of vital force.

Bearing in mind the reference made to the importance, histogenitically, of a due supply of the inorganic constituents, more especially the phosphate of lime, the circumstances of a constitutional character, under which these conditions are commonly met, and in which the demand for this substance is peculiarly great, are during the periods of gestation, also that of puberty, or at the age of from 12 to 18 in both sexes, in which rapid growth and development, together with the constitutional changes peculiar to this time, create a demend upon the vital powers, which, if not met, must result more or less disastrously to these important organs the teeth.

If it be conceded that one of the conditions of the normal nutrition, the maintenance of the form, size and composition of all organic bodies, is a due supply of food containing the elements upon which the vital forces may expend their energies, in the preservation of the harmony and integrity of the whole, of no less importance is the fact that the animal economy will appropriate no greater amount than the vital principle which stimulates the organ will allow.

In a large percentage of the cases coming under the notice of the Dentist, the attempt to preserve those important organs, the teeth, by purely local and mechanical means, when the conditions upon which their very existence depends, remain imperfect, cannot but result more or less disastrously, either in their utter loss, or marred appearance and usefulness. The great benefit claimed from the use of the phosphates is, without doubt, due mainly to their general stimulant effect upon the nervous, muscular and circulatory systems, to which reference has been made; and doubtless in the phosphatic preparations we possess an agent of great therapeutic value; yet its indiscriminate use, even in cases where it seems to be indicated, especially when exhibited for the specific purpose of supplying the tissues with the phosphate of lime, is not only questionable practice, but not unattended with danger.

THE Anniversary Dinner of the Licentiates in Dental Surgery, and Odonto-Chirurgical Society, will take place on Friday, the 13th inst., in the Balmoral Hotel, Princes Street, Edinburgh, Mr. Robert Reid, L.D.S.Eng., in the chair.

THE

DENTAL RECORD.

VOL. V. APRIL 1, 1885. No. 4.

COCAINE.

By C. J. Boyd Wallis, L.D.S.Eng., &c.

Cocaine has so suddenly taken an important place in our *materia medica*, and such a great demand for it been established, that, as a result, some impure samples have appeared in the market; therefore a few additional notes, with tests, upon the alkaloid and its salts may be of value to the readers of this journal.

In addition to the salts of cocaine already named in a previous article,* the sulphate, nitrate, tannate and oxalate may be added to the list of those which have been prepared; besides these, double salts of cocaine-platinum chloride and of cocaine-gold chloride have been produced, and a new base has been formed of cocaine, by decomposition with strong acids, which is called ecgonin.

The German Pharmacopœia Committee have decided to recommend that hydrochlorate of cocaine should be included in the next edition of the *Pharmacopœia Germanica*, and have drawn up its characters and tests for that purpose. This salt is described as a white crystalline powder of weakly acid reaction, with a somewhat bitter taste, and producing in the tongue a highly characteristic insensibility that quickly passes away; but its action on the tongue and mucous surfaces is said to be more intense than that of the alkaloid itself. The salt dissolves easily in water and in alcohol, and in solution acts as an antiseptic, delaying the putrefactive changes in an extract of meat.

Tests.—A solution of iodine produces a red brown precipitate in an aqueous solution of this salt, and caustic alkalies a white crystalline precipitate, which redissolves with great difficulty in water, but readily in alcohol or ether. The compound is dissolved with frothing by concentrated sulphurous acid, but without undergoing change of colour; nitric and hydrochloric acids also dissolve it colourless. The hydrochlorate should leave no residue when heated upon platinum foil; it should dissolve in double its weight of cold water, and should not become coloured in contact with mineral acids.

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* See page 1, January Number.

Picric acid, added to aqueous solutions of the hydrochlorate, throws down a yellowish precipitate.

The Physiological Action of Cocaine has been externally and internally studied by several experimenters, and notably by Dr. Hermann M. Biggs, of New York, who has carried out a series of systematic and successful experiments for the purpose of elucidating the physiological action of cocaine.

The following is a brief summary of these experiments:—Among animals it has been found that frogs are more susceptible than warm-blooded animals, and that the carnivora are more sensitive than the herbivora. For a dog the fatal dose of cocaine is stated to be from 3 to 5 grains, and for rabbits 0·1 gramme per kilogramme of animal. Given internally in small doses to warm-blooded animals it stimulates the nerve-centres, acting more decidedly upon the higher psycho-motor cells of the brain; then upon the medulla oblongata and cord. Moderate doses increase the rapidity of beat of the heart without impairing its strength.

In experiments on frogs the action of cocaine on the heart and on respiration was found well marked. In small doses it at first increases the number of respirations and then decreases them, but in larger quantities death ensues from paralysis of respiration. It has a depressent action, too, on the heart, reducing the force and frequency of its pulsations, and finally arresting it—both auricles and ventricle—in diastole. The action on the nervous system is still more marked. Small doses increase the reflex irritability of the cord for a short time, but when larger doses are given the period of heightened reflexes is lessened, and is followed by a period of longer duration, in which they are decidedly diminished. It appears from the researches of B. von Aurep that small doses heighten the irritability of the sensory fibres, but exert no effect on the motor filaments. Large doses almost completely paralyse the sensory filaments and diminish greatly the irritability of the motor. Small doses given hypodermically have little effect on the excitability of the voluntary muscles, but large doses diminish their contractility very decidedly. The pulsations are shorter, slower, and more feeble, and muscular excitability is soon exhausted.

Dr. Biggs thinks that, from the local and constitutional effect of cocaine on the different organs and tissues, it is highly probable that its general action is a purely local one, exercised on those parts for which it has a chemical affinity through the medium of the blood. He concludes, as the result of his experiments, that the use of cocaine is indicated both in tetanus and in strychnia poisoning.

The alkaloid has not been used medicinally to a very great extent. The dose for an adult is from one-sixth to two grains. It is not cumulative in its action, and its lethal power upon the human body is not great. It appears to act as a narcotic, having primarily a stimulating action upon the brain, and is somewhat analogous in properties to *cannabis indica.* Large doses have been found to produce vertigo, lassitude, slight deafness and disturbance of memory. It acts as a stomachic, and is useful after excess in eating or drinking. The condition of the stomach is improved by its use in atonic indigestion and nervous affections of this organ, as well as in cases of cachexia and phthisis, particularly those arising from the use of mercury. In a previous article it was stated that the action of cocaine was more pronounced when applied to highly sensitive dentine than when applied to that of a more dense and yellow character; further experiments have confirmed this statement, inasmuch that the best results have been obtained by its application to such vascular tissues as are susceptible of its easy penetration, its action tending to produce anæmia in the parts under its influence, thereby showing that a fairly active circulation is necessary for the highest state of anæsthesia.

Preparations of Cocaine.—In communications to the medical journals, the writers have complained of a "cocaine fungus" appearing in their solutions a few days after mixing, for which they sought a remedy. I think this fungus will be found only to appear in weak solutions of the salt, as I have detected nothing of the kind in my own solutions of 25 and 50 per cent. strength; but it is liable to form in weak solutions, such as 4 per cent. This difficulty may be remedied by the addition to the solution of a small quantity of camphor, salicylic acid or eugenol. The choice of these must depend upon the purpose for which the solution is required. According to Dr. Symes, a solution of cocaine hydrochlorate of any given strength is most active when neutral or slightly basic, and the same solution if rendered decidedly acid is less effectual; in fact, an acid hydrochlorate of cocaine, although more soluble, is less active than a neutral salt. This would indicate that camphor water or some neutral essential oil is the best solvent when the solution is to be kept any length of time.

The fungus should be prevented for several reasons, since it causes irritation of the mucous membranes and profuse urethritis, and also produces epithelium denudation.

Oleate of Cocaine.—Oleic acid is obtained by the action of superheated steam on palm oil, and afterwards separating by pressure the liquid oleic from the solid palmitic acid. It is a pale, brownish-yellow, oily liquid, having a slightly acid reaction, and does not readily become rancid on exposure to the air. If 50 c.c. of oleic acid be shaken with 50 c.c. of water containing 1 c.c. of aqua ammonia (10 per cent.), the lower aqueous liquid should not redden blue litmus paper.

Oleic acid is insoluble in hot or cold water, but easily soluble in alcohol, ether, chloroform, carbon bisulphide, benzole, petroleum, benzine, oil of turpentine and fixed oils. With hydrate or carbonate of potassium it combines to form potash soap (*soft soap*), which consists of potassium oleate ($KC_{18}H_{33}O_2$). It dissolves most metallic oxides, forming oleic solutions which are soluble in oils, fats, and petroleum ointments, and it dissolves the alkaloids, but not their salts. However, Mr. Blades, M.P.S., informs me that 48 grains of either morphia hydrochlor. or morphia pure will alike dissolve in one ounce of oleic acid by the aid of heat. In warming the oleate, porcelain dishes over a water bath should be used. Metallic spatulas should never be used; glass rods or wooden spatulas are best.

Oleic acid is rapidly absorbed by the skin, and greatly aids the absorption of drugs with which it is combined. This absorption may be rendered slower when desired by the addition of fresh lard, olive oil, lard oil, or oil of sweet almonds.

Oleates of Alkaloids.—Solutions of alkaloids in excess of purified oleic acid are made of 2 parts of the alkaloid dissolved in 98 parts by weight of purified oleic acid. Morphia is made into 2, 5 and 10 per cent. oleates, and quinine into 5, 10 and 25 per cent. oleates. Veratrine oleates are used of 2 and 10 per cent. strength; the latter is mostly employed.

Oleanodyne is a combination of the alkaloids aconitia, atropia, morphia and veratria with oleic acid. It can be diluted as desired with chloroform, alcohol, ether, eugenol or oils. It forms a powerful anodyne, and is rapidly absorbed. With the addition of cocaine, it is a valuable external application for the treatment of neuralgia, and for an exposed and highly sensitive pulp just prior to its removal; also for allaying pain whilst operating on sensitive dentine.

Oleates of Potassium and Sodium.—According to Mr. H. B. Parsons, it is necessary to have tolerably pure oleates of potassium or sodium for the preparation of the oleates of other metals, and for nearly all cases the very best white Castile soap is sufficiently pure; that known as Conti's is good. For all practical purposes this soap may be considered as *sodium oleate*, and it is best used in the dried and powdered state, as the amount of water varies for different samples.

Solution of Sodium Oleate.—To sixteen ounces of best powdered Castile soap add one gallon of distilled water, and stir well until an even and transparent mixture is produced. Then add more water and heat until dissolved, making the finished, cooled and slightly turbid solution measure sixteen pints. Each pint of this solution equals one ounce avoirdupois of Castile soap, which, for practical purposes, may be considered as sodium oleate.

Oleate of Arsenious Acid is best prepared by dissolving 48 grains of crystal arsenious acid in one pint of boiling water, by the aid of 48 grains of bicarbonate of potassium. To this solution, when cool, add 220 grains of hydrochloric acid (sp. gr. 1·16), or an equivalent larger amount of weaker acid. This gives arsenious chloride ($AsCl_3$) in solution, without the danger of poisoning which is incurred on boiling together arsenious and hydrochloric acids. Dilute this solution with two pints of distilled water, and slowly add to it one pint of solution of sodium oleate. Then warm the mixture until the oleate separates, draw off the aqueous liquid, and wash twice with boiling distilled water. The *oleate of arsenic* thus produced is of a yellowish colour, and has about the consistency of butter. The product should equal about one ounce avoirdupois.

The *Oleate* of arsenic in combination with pure morphia or the oleate of cocaine is a rapid method of obtaining the action of arsenious acid on an exposed dental pulp or upon sensitive dentine.

and may therefore prove useful in such cases when time is of importance, and it is necessary to destroy and remove the pulp in one visit.

OLEATE OF COCAINE.

For Application to the Gums Prior to Extraction and to Sensitive Dentine.

℞	Atropine Sulphate	1 grain.
	Cocaine, Pure...	60 ,,
	Oleic Acid ... q.s. to make up ʒiv by measure.	Misce.

In cases of extraction the gum should be dried and protected by a napkin, and the oleate then applied around the offending tooth. In its application to sensitive dentine, the cavity of the tooth should be first wiped out with wool dipped in absolute alcohol, and the oleate then applied and protected with wax or gutta percha rather than with liquid cement, for the latter is liable to flow under the application and prevent its freely acting upon the dentine.

The oleate of cocaine is an excellent and painless medium for the application of arsenious acid, particularly when time is a consideration, for it acts very quickly. I have little faith in the use of cocaine in the extraction of teeth, its action does not penetrate the tissues sufficiently to be of service in relieving the pain arising from the actual removal of the tooth from the surrounding wall of bone, though it may, and undoubted does in some cases, prevent the pain that would arise from the forceps crushing through the mucous tissues; and for this special purpose I would recommend the above oleate. Further experience will in all probability prove that in the extraction of teeth the best results will be obtained by the subcutaneous injection of a (2 to 4 per cent.) solution of cocaine hydrochlorate in the immediate neighbourhood of the offending tooth.

Application for the Treatment of Exposed Pulp and Sensitive Dentine.

℞	Cocaine, Citrate or Hydrochlorate	100 grains.
	Atropine Sulphate	2 ,,
	Camphor	5 ,,
	Eugenol	ʒiss
	Absolute Alcohol ... q.s. to make up ʒiv by measure.	Misce.

The strength may be varied to suit any special case, and it may be used in the form of a thin cream. The application, placed in the tooth, should be protected by the addition of a covering of wax or gutta percha, which for this special purpose are superior to liquid cement.

Coca—Styptic Collodion.

℞	Cocaine Hydrochlor.	grs.	xx.
	Acid. Tannic.	„	xxx.
	Collodion Flexil.		℥ij.
	Alcohol pur. q.s. Misce fiat solutio.		

Dissolve the cocaine in a fluid dram of the alcohol previously warmed, and gradually add the finely powdered tannic acid, adding, if necessary, a little more warm alcohol, and stir until nearly cold, finally slowly add the collodion while stirring; keep in well corked bottles.

This admirable styptic allays pain and promotes healthy granulation. I have found it a very useful application for allaying pain after extraction.

Coca—Styptic Powder.

℞	Fol. Erythrox Coca desicc		℥ij.
	Acidi Tannici		℥ij.
	Acidi Salicylici	grs.	xx.
	Cocaine Hydrochlor.	„	xx.
	Spirit. Vini Rectif. q.s.		

Thoroughly dry the coca leaves, powder, and pass through a fine wire sieve. Dissolve the cocaine and salicylic acid in a necessary quantity of alcohol and mix it thoroughly with the powder in a hot mortar, finally add the tannic acid, mix and pass all through the sieve again.

This styptic powder arrests bleeding of an obstinate character, relieves smarting or pain, and promotes healing. It is a very useful application to the alveolar socket after the extraction of a tooth. Cocaine itself is a useful hæmostatic.

Cocaine Eye Wash.

℞	Cocaine Pur.	grs.	vj.
	Liq. Plumbi. Subacet. Dil.		℥iv.
	Aq. Flor. Aurant. vel Sambuci		℥iv.
	Acid. Acet. q.s.		

Dilute a *few drops* of the acid with a little of the orange or elder-flower water, and dissolve the cocaine in the mixture and add the rest of the water. Stir in the liq. plumbi dil., and allow the solution to stand for twenty-four hours, occasionally shaking it, then filter or decant.

The above is a good application for weak or sore eyes, and strengthening the sight: and is a valuable wash for the eyes after long hours of study or work, such as a dental surgeon is too liable to try these organs with.

The notes on the Oleates have been introduced here as they are coming so much into use, and are proving of great value in the treatment of disease; and I think that they are likely to come into more extended use in Dental Surgery, some details of which I may have the opportunity of noticing in a future paper.

NECROSIS OF LOWER JAW.

Reported by Chas. W. Glassington, M.R.C.S., L.D.S.Edin.

E. J., age 74, was first seen on August 13th, 1883. Two years before, the patient fell down stairs and struck the right side of the face. Soon afterwards a swelling appeared over the upper maxilla, which gradually increased, and burst about four months after the accident. A month later another swelling, which had appeared at

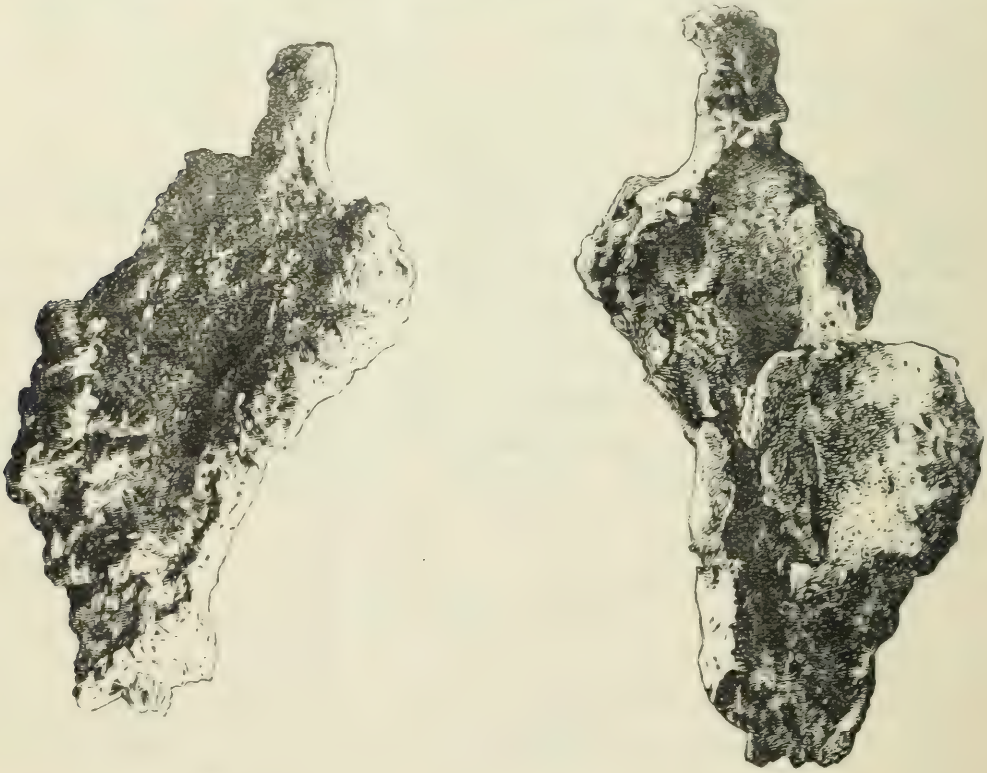

Fig. 1. Fig. 2.

Fig. 1 illustrates the outer and Fig. 2 the inner aspect of the sequestrum.

the angle of the jaw, burst into the mouth. When first seen both openings were patent and discharging freely, with the usual characteristic fœtor of dead bone, which on probing could be felt. This condition continued for five months, the treatment consisting of disinfecting gargles and tonics. Ultimately a small piece of bone was taken away. Four months afterwards the patient was seen again, when the jaw had become fixed, and on examining the mouth a large sequestrum was found. Chloroform was administered, and first one piece and then another removed with the Lion forceps, when it was found to consist of the Ramus and body of the lower jaw of that side. The patient rapidly recovered after this, the fœtor and discharge soon ceasing. In July, 1884, every sinus had healed, excepting a small one, which had nearly closed.

ON SOME ANÆSTHETIC APPARATUS.

By WALTER TYRRELL, L.R.C.P.Lond., M.R.C.S., Senior Anæsthetist to the Hospital; Anæsthetist to the National Dental Hospital.

From "St. Thomas's Hospital Reports."

I.—AN IMPROVEMENT OF CLOVER'S PORTABLE REGULATING ÆTHER INHALER.

A LONG practical experience with Clover's inhaler has led me to introduce the following modification of it, by which the amount of æther vapour and fresh air inhaled, and the amount of expired air set free from the apparatus can be regulated, and brought completely under the control of the administrator without moving the face-piece.

After using this instrument for general purposes in the hospital for nearly two years, I am so well satisfied with its advantages that I venture to describe it as an improvement on Clover's pattern.

Clover's inhaler, although all that could be desired for regulating the supply of æther vapour, makes no provision for the admission of fresh air other than by the complete or partial removal of the face-piece. The air admitted in this way must pass directly into the lungs, mixed with little if any æther vapour, and in an unknown quantity, only to be finally estimated by its effects upon the patient; and when approaching consciousness renders it necessary to again exclude the admission of fresh air, the sudden change to strong æther vapour often produces choking and troublesome cough.

In fact, the administration is attended with a constant change in the strength of the æther vapour.

Such changes are much more likely to produce choking and respiratory spasm, wherein lies the chief danger of the adminstration, than the breathing a vapour of almost constant strength.

At the commencement of æther inhalation, it is no doubt a great advantage to cut off the supply of fresh air entirely, and make the patient breathe a gradually increasing strength of æther vapour.

Diminishing the amount of oxygen respired apparently blunts the sensibility of the larynx, for the patient breathes the vapour much more readily, and the inhalation is attended by much less excitement and struggling, and is far safer than the sudden smothering with æther from the leather cone and sponge, or those methods in which the amount of air admitted is unlimited.

But in continuing the administration some fresh air is necessary, and the object I have in view is that this should be admitted without raising the face-piece, and be regulated and as completely under control as the æther vapour.

Ophthalmic surgeons will recognise the advantage of a modification which obviates the necessity of any movement of the face-piece upon which the operator's left hand is constantly resting while fixing the eyeball during an operation. And here I must note, although my space will not allow me to go into details on the subject, that Mr. Marcus Gunn introduced at the Royal Ophthalmic Hospital some years ago such a modification. His plan, however, entailing as it did the holding down of a spring, was inconvenient.

The following, then, are the desiderata of a good æther inhaler:

1st. Means by which the anæsthetic can be given gradually, its supply being kept properly under the control of the administrator.

2nd. A comfortable face-piece, which shall fit so closely that all fresh air may be at once excluded from the commencement of the inhalation.

3rd. An expiratory valve which may be kept entirely closed, or which may be allowed to act more or less freely at the will of the administrator.

4th. An inspiratory valve, also under the control of the administrator, and so arranged that all fresh air entering thereby may be made to pass over the æther, before entering the patient's lungs.

5th. A soft india-rubber bag, to contain what I may term an extension of the residual air (or rather ætherised air and carbonic acid) of the lungs.

All these requirements are attained by my inhaler, of which a description follows:

Figures 1 and 2 are diagrams of the æther chamber in Clover's inhaler, which is identical with the reservoir in my own modification, since it appears to me incapable of improvement.*

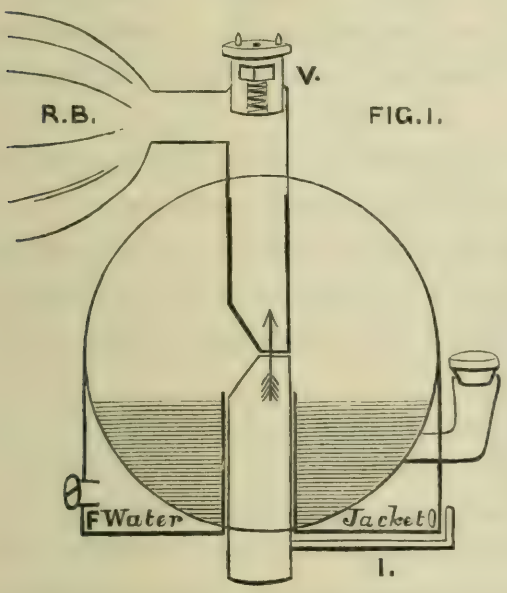
FIG. 1.

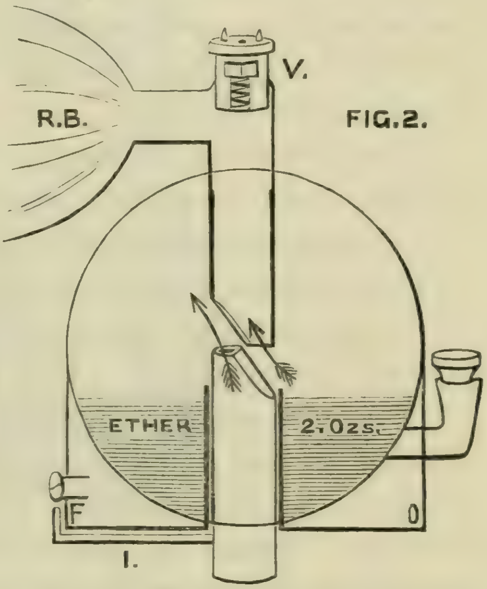
FIG. 2.

It consists of a metal sphere to contain the æther, through which passes a metal tube, divided in the centre.

The divided ends of this tube are shaped like a whistle, and the lower half, instead of being fixed as is the upper, is capable of a rotatory movement to be imparted at the will of the administrator.

A glance at the accompanying diagrams will show that when the indicator I is placed at 0 on the index, the open ends of the divided tube face each other exactly (Fig. 1), so that any expiration or inspiration must pass directly into and from the residual bag, without contact with the æther in the chamber.

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* I believe that no full description of Clover's inhaler has been before published, otherwise I should have spared my readers this description of his admirably-designed æther reservoir.

When, on the other hand, the indicator is placed at F (Fig. 2), no vapour or air can possibly reach the patient's lungs either from the residual bag or from the outer air (through the inspiratory valve V) without passing over the æther on its way.

It will be seen that the relative positions of the whistle ends of the tube passing through the æther vessel can be altered by the administrator by moving the indicator, so as to ætherise the inspired air more or less completely at will.

The indicator moves upon a graduated scale, by which the administrator can tell at a glance how much of the air inspired is passing over the æther.

For instance, with the indicator at 2, he knows that half the air passing from the residual bag to the face-piece, and *vice versâ*, passes directly through the tube, the other half passing over the liquid æther on its way.

The sphere which contains the æther is of such a size as to hold two fluid ounces in any position without overflowing.

In the most usual position for inhalation (with the patient lying on his back), the æther is surrounded by a water-jacket, as shown in the diagram, the object of which is to prevent its too rapid cooling by evaporation.

The face-piece I use differs very materially from Clover's. It is made of pure india-rubber, of sufficient thickness to retain its form, and backed by a metal plate into which the mountings are screwed. Round its free margin runs a rubber inflatable air cushion, so shaped as to rest upon the face with perfect comfort, while fitting so closely as to be for all practical purposes quite air-tight.

It will be seen from the following diagram (Fig. 3) that my æther reservoir is capable of being fixed in either of two different positions.

That shown by the dotted line is the more convenient for general use, while the lower position is the most useful for eye operations, inasmuch as by it the inhaler is kept quite out of the surgeon's light. The mount, for the time being unoccupied by the reservoir, is secured by a metal cap.

In the upper part of my face-piece A is fixed an expiratory valve, such as is used in the administration of nitrous oxide gas, and *it is this valve and a corresponding inlet valve* (B) *that I claim as the chief advantages of my modification.*

By means of a little switch placed upon a movable metal cap (A), the expiratory valve is kept entirely and absolutely under the control of the administrator, who may allow more, or less, or none of the expired air to escape at his will.

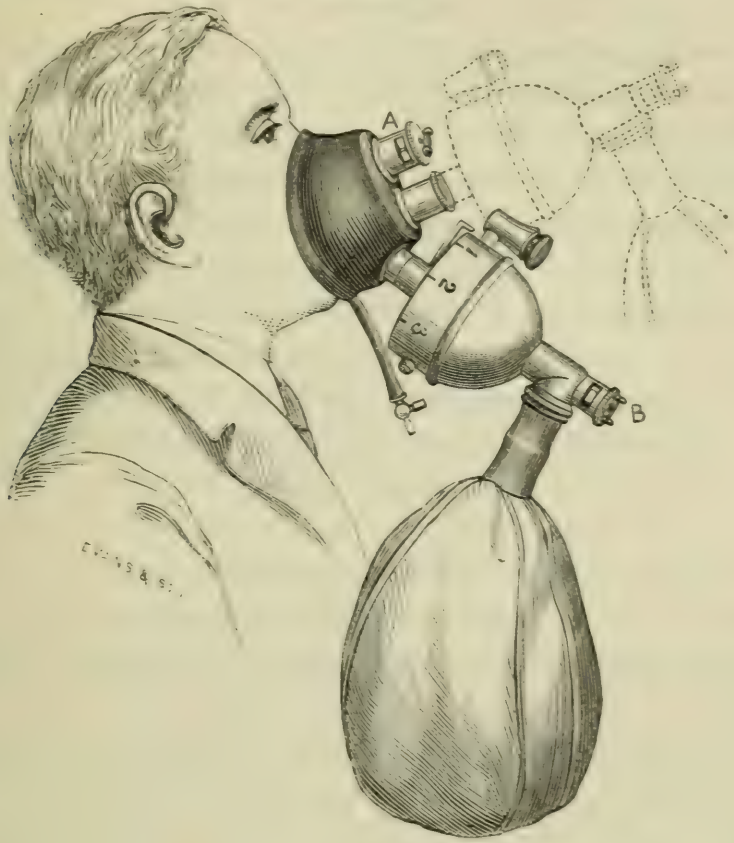

FIG. 3.

When this switch crosses the centre of the cap A, and the latter is pressed down upon the back of the face-piece, the valve is closed and fixed, and the patient can then only expire into the residual bag; while, if the switch is turned to either side, the expired air escapes freely through the valve, and by slightly raising or depressing the cap, a regulated and definite portion of each expiration may be allowed to escape.

The tube leading from the æther reservoir terminates in a soft rubber bag which contains what I call the residual mixture of æther vapour, &c.

Finally, between the residual bag and the liquid æther, there is an inlet valve B which is also under control.

With this apparatus I administer æther in the following way:

Placing the *indicator at* O, and having *emptied* the *residual bag* of any æther vapour that may have leaked into it, I apply the face-piece *firmly*, keeping the *valve* A *completely closed*, whilst B is *allowed to remain open*. The inlet valve B is constructed with sufficient tightness to allow no air to pass until the bag has been quite emptied by an inspiration, so that, as a rule, it may be left open during the whole time of administration.

I know that whilst the indicator is at 0 the patient is breathing directly into the residual bag, none of the air respired passing over the liquid æther (*vide* Fig. 1); nevertheless, a certain amount of vapour leaks from the reservoir through the junction of the whistle ends of the tube in its centre,* and in very hot weather sufficient æther vapour may leak into the apparatus in that way to produce a sense of suffocation, in which case the cap of the unoccupied mount on the face-piece may be removed and gradually reapplied.

The face-piece being fixed in position, I allow the indicator to remain at 0 for about a minute or until the patient shows confidence in being able to breathe by respiring freely.

I then revolve the indicator slowly towards 1, making a very slight advance every fifth or sixth expiration.

In about two minutes the indicator marks 1, and in another minute the patient is generally completely under the influence of the æther.

For women and children, I very rarely find it necessary to proceed further with the indicator, except in very cold weather, when the water in the water-jacket (which should be previously warmed to 65° or 70° Fahr.) quickly cools.

With adult men it is sometimes necessary to go as far as 1½, or with those who have indulged freely in alcohol to 2; but even in such cases, as soon as the patient has been completely under the influence of the anæsthetic for a few minutes, I can usually turn back the indicator to 1. If at any time during the administration the necessity for fresh air occurs (shown by blueness of surface, and especially by slight involuntary twitchings and jerky spasmodic breathing), the residual bag may at once be partially or completely emptied by turning the switch on the cap of the valve A, thus allowing the expired air to escape whilst fresh air enters in corresponding quantity at B.

Should complete respiratory spasm take place, it is of course wisest to remove the face-piece altogether until natural breathing is re-established. Such spasm, however, very rarely occurs with this method of giving æther.

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* This is shown as a slight space, which should not really exist; in Fig. 1, with the arrow passing through it.

When the patient is completely ætherised, and during the whole of a long operation, I raise the cap of the valve A very slightly, so as to allow a small portion of each expiration to escape. Then at each inspiration the patient draws in at B an equivalent amount of fresh air. Thus a small amount of the ætherised air in the residual bag is exchanged at each respiration for a corresponding amount of external air freshly ætherised. This amount, which as a rule need not exceed one sixth or one fifth of each respiration, is easily regulated by raising or depressing the cap of the valve A.

This apparatus may be described as a chamber containing an extension of the residual air of the lungs, with *a regulated and limited* supply of æther and fresh air.

II.—An Apparatus for Prolonging the Anæsthesia of Nitrous Oxide Gas.

This instrument is especially useful for short operations performed in the surgeon's consulting room, for which the anæsthesia of nitrous oxide gas alone gives insufficient time ; for instance, the extraction of several teeth, the operation for squint, the opening of abscesses, passive movement of stiff joints, or so-called "bone-setting," the removal of nails, &c.

It will be seen from the following diagram that the face-piece is in every way similar to the one I use for my æther inhaler, described in Part I of this paper.

To the *lower mount* is attached an india-rubber bag, communicating with the supply of nitrous oxide gas, and between this bag and the face-piece there is an *inspiratory* valve.

To the *upper mount* an *expiratory* valve is fixed with a metal cap and switch, exactly identical with the one already described.

To the remaining mount a miniature Clover's æther reservoir is attached, with the residual bag and inlet valve, but without the water-jacket; and this omission has the object of diminishing the weight.

The reservoir is made to hold half a fluid ounce. I put into it that quantity of æther, or one drachm of either of the following:

—(1) Dichloride of ethidene, (2) bichloride of methylene, or (3) Regnaud's chloroform mixture (which consists of four parts of chloroform to *one* of methylic alcohol), and I have also used a few times chloroform and eau de Cologne (equal parts) with good results.

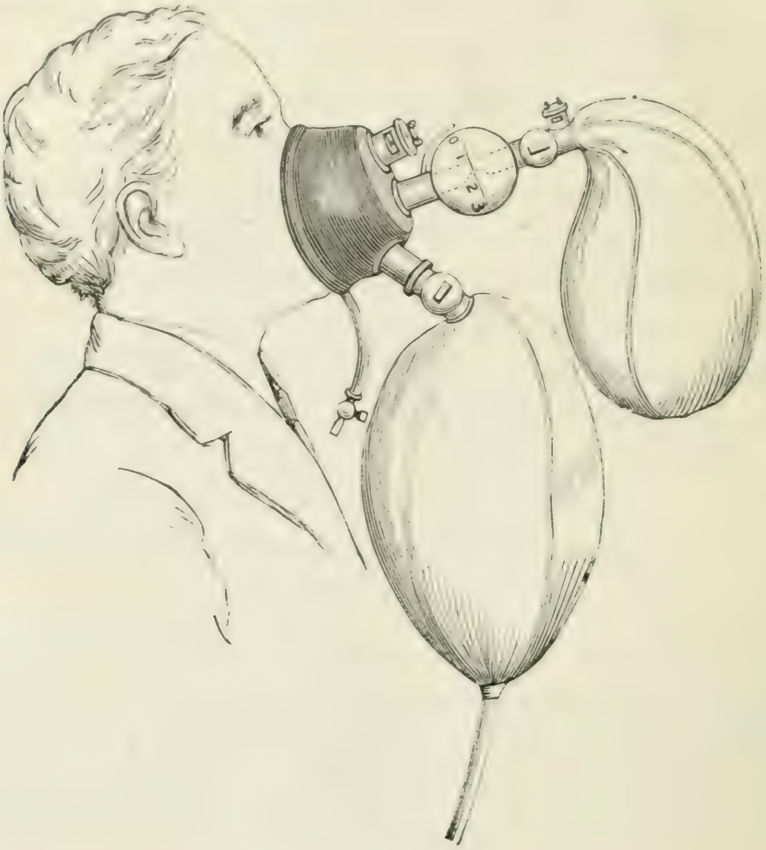


FIG. 4.

I prefer ethidene; but for the sake of economy I have employed Regnaud's anæsthetic mixture for hospital dental patients (200 times), and with very satisfactory results.

Having charged the reservoir, I empty the residual bag and turn off the stop-cock leading to it; with the indicator at 0, I apply the face-piece and let the patient inhale nitrous oxide alone, whilst the expirations are disposed of through the expiratory valve.

After four or five deep respirations, or if the breathing is shallow, after more than double that number, I open the way to the residual bag and check the action of the expiratory valve by turning the switch upon it.

The patient then expires through the reservoir into the bag beyond, from which he breathes the gas over and over again. I meanwhile move the indicator very gradually towards 1.

If there is æther in the reservoir, I proceed with the indicator as far as 1, *i.e.* with a quarter of the gas respired passing over the liquid æther.

If the reservoir contains either of the other anæsthetic agents mentioned, I revolve the indicator scarcely half way towards 1, *at the same time* watching the pulse, respiration, and pupil.

I have very seldom noticed any indication for stopping the administration until the breathing has become stertorous. At this point, if the face-piece be removed, the operator can generally depend on two minutes of complete anæsthesia.

The return to consciousness being much more gradual than when gas alone is used, the face-piece may be reapplied and further time obtained for the operation.

This may be done even in the case of a dental operation, provided there be not much bleeding.

But it is not suitable for operations lasting more than five minutes. For these and longer cases, I find it convenient to commence with this apparatus, then proceeding with my modification of Clover's portable inhaler, this being much less cumbersome than Clover's gas and æther apparatus.

I know that many will wonder at my venturing to give a chloroform mixture in an inhaler from which air is excluded, especially as I have no means of knowing the percentage of anæsthetic vapour respired.

My answer is, that I *do* know that a drachm of the mixture generally suffices for seven or eight dental patients taken one after the other, and that allowing for the evaporation of an equal amount, both during the operation and while preparing for it, there is a very small proportion left for each single case.

Moreover, its administration is effected so very gradually that *sudden* cardiac failure is extremly unlikely to occur.

In five minutes from the commencement of the operation, the patient can generally leave the chair, and shortly after is able to walk home. The result of my experience is that I have only noted one instance of vomiting out of 200 cases.

The face-pieces were made for me by Messrs. G. Barth & Co., Poland Street, while Messers. Mayer and Meltzer are the manufacturers of Clover's æther reservoir. Both firms supply the entire apparatus.

Since this article was written last autumn, and its publication in *St. Thomas's Hospital Reports*, Mr. Tyrrell has brought forward and been using at the National Dental Hospital a very useful and simple modification of the apparatus described in the foregoing paragraphs. This instrument has not any inlet valve, such being unnecessary for Dental cases; and having been designed for Dental purposes, and for the use of gas and *æther* only, a complete water-jacket has been added, which prevents the rapid cooling of the æther, as when the apparatus is used for several cases in succession.

By holding the residual bag in the hand, so that no expired air enters it, until five or six deep inspirations of N_2O have been taken, then by liberating the bag and switching off the outlet valve, the expired gas enters the bag. With the indicator at 0, only the gas passes to and fro; but when moved round to 1, a part of the expired gas passes over the æther on its way to the bag, and again on being inspired. With the indicator at 2, still

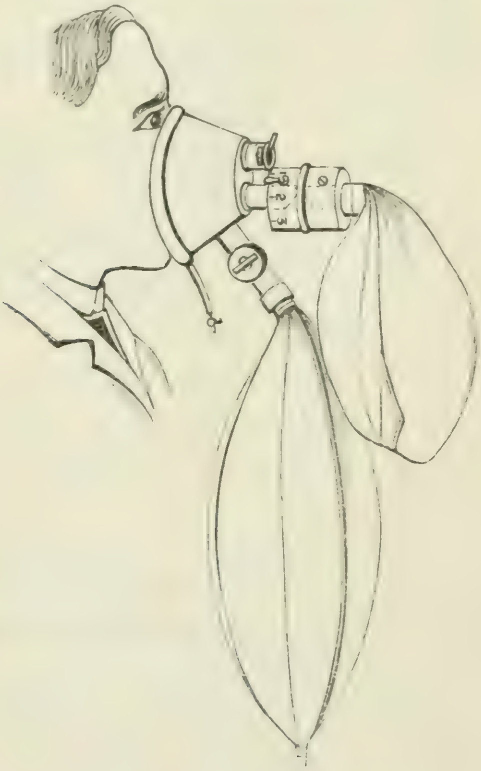


FIG. 5.

Fig. 5 illustrates the modified apparatus for Dental cases, the æther chamber having a complete water-jacket.

more gas is allowed to pass over the æther, until when at 4 it all comes in contact with the æther. The full details of the currents and their regulation have already been described, and by reference to the illustrations the working of the apparatus will readily be intelligible.—Ed. *D. R.*]

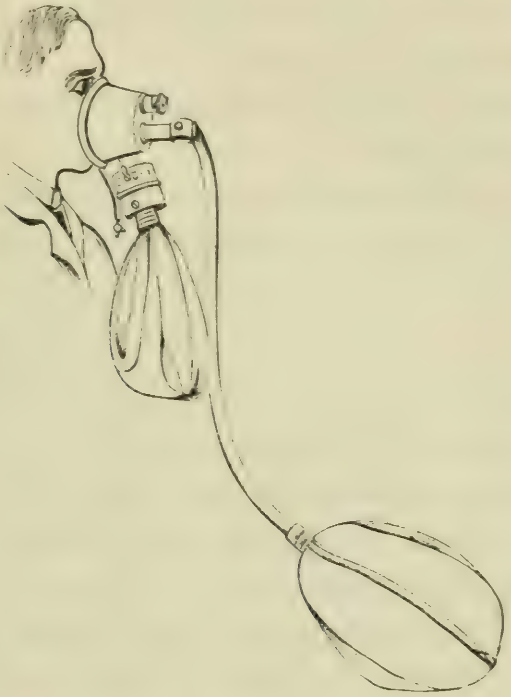


Fig. 6.

Fig. 6 shows how the æther chamber can be applied to an ordinary gas face piece.

PROSECUTION UNDER THE DENTISTS' ACT.

Alexander Ross French, who had for some time been practising as a dentist at 193, South Street, St. Andrews, was on the 6th of March charged before Sheriff Henderson at Cupar, Fifeshire, with offences against the Dentists' Act.

The "libel" set forth that Alexander Ross French, formerly a confectioner in Dundee, and now or lately residing at 193, South Street, St. Andrews, had contravened the Dentists' Act of 1878, in so far as he had, between July, 1884, and January, 1885, unlawfully taken and used the title, name or title of "Dr." French, "Dental Surgeon," by having the same on a door plate, lamp, and signboard at his place of business at St. Andrews; and also with unlawfully using the names or titles of "D.D.S.," "Resident Surgeon,"

" Dr.," " Dental Surgeon," and " D.S.," by publishing the same in newspapers and on handbills, and circulating the same in St. Andrews and elsewhere.

Mr. Peter Fleming, St. Andrews, appeared for the prosecution, the defendant defending himself.

The defendant pleaded " Not Guilty," and objected to be described as a confectioner.

Mr. James Robertson, Solicitor of Edinburgh, deposed that he held the office of Registrar of the Scottish Branch of the General Medical Council, and that that body had given its consent to the prosecution. He produced the Dentists' Register for last year, and stated that the name of Alexander Ross French did not appear in it, nor did the name appear in the Medical Register. Witness had in his possession proof sheets of the London and Dublin registrations, and was satisfied from his official knowledge that the defendant's name did not appear in any of them, and that he was therefore not entitled to practise.

Mr. W. Bowman Macleod, George Street, Edinburgh, stated that he was Honorary Secretary of the Scottish Branch of the British Dental Association, and was the complainant in the case. The case had been brought under his notice in his official capacity, and he had obtained permission to prosecute.

James Forrester, bootmaker, St. Andrews, proved that the titles were used as specified in the summons. His evidence was corroborated by James Robertson and Joseph Graham.

The Defendant made a long and rambling defence, dwelling upon the fact, that he especially stated in his advertisements that he was not registered, and had not assumed any title which implied that he was registered. The title which he had assumed, " D.S.," was not a registrable title nor a British qualification ; the only registrable dental title in Great Britain was that of L.D.S., and that he had never laid claim to. He argued, therefore, that he had not attempted to deceive anybody as to his real position. He asserted that he had great skill in the exercise of his profession, and could do better than many of those who made a great fuss about being registered. He complained of the high fees charged for the dental diploma, and asserted that if it were not for the expense he should be quite willing to submit himself for examination.

The Sheriff said it was impossible for him to do otherwise than convict. The offences proved were a clear contravention of the

3rd and 4th Sections of the Act. He assured the defendant that he would find it a very difficult matter to set himself against an Act of Parliament and against society, and he advised him to give up exercising his wits in endeavours to circumvent the plain words of the Act.

In reply to a question from the Sheriff as to whether the prosecution demanded the infliction of a substantial or only a nominal penalty, Mr. Fleming replied, that they had offered to withdraw their complaint if the defendant would promise to conform with the provisions of the Act for the future, but he had declined to do so. He had, in fact, put the prosecution to considerable expense.

The Sheriff then said that the defendant having pleaded "not guilty," had obliged the prosecution to incur additional expense, which it would be necessary to recoup. The accused would have to pay a fine of £10, failing the payment of which he would be imprisoned for seven days. He would be allowed three days to decide which of these alternatives he would choose.

The defendant stated his intention of appealing against this decision.

THE DENTAL HOSPITAL OF LONDON.

THE Annual General Meeting of Governors of the Dental Hospital of London was held at Leicester Square, on March 12th. Colonel Sir James McGarel Hogg, Bart., K.C.B., M.P., one of the Vice-Presidents, in the Chair.

The Committee of Management, in presenting their Twenty-seventh Annual Report, are gratified in being able to announce that the past year has again been one of prosperity.

The total amount received for the General Fund during the year was £1,662 0s. 10d., as against £1,697 6s. in 1883, and £1,540 4s. 7d. in 1882.

The Donations of Life Governors during the past year amounted to £325 5s., as against £491 5s. in 1883, and £333 5s. in 1882.

The Annual Subscriptions amounted to £673 11s. 6d., as against £675 13s. 6d. in 1883, and £584 6s. in 1882, while the General Donations amounted to £110 3s. 3d., as against £99 11s. 11d. in 1883, and £124 0s. 5d. in 1882.

The amount received from the Metropolitan Hospital Sunday

Fund was £70, and from the Hospital Saturday Fund £43 12s. 10d., being £22 3s. 5d. more than was received from these sources for the previous year.

A legacy of £50 has been received from the executors of the late Mrs. Normansell, whose late husband took such a warm interest in the Charity.

The total receipts for the year were £1,857 3s. 3d., the expenses being £1,360 0s. 6d., leaving a balance of £497 2s. 9d.

The Managing Committee have the gratification to report that they have during the past year been enabled to reduce the Mortgage Debt on the Hospital by £1,500; they regret, however, that there is still a deficit of £3,471 3s. 11d. in the Extension Account, and they are reluctantly compelled to make a further special appeal for the funds necessary to pay off this encumbrance, which presses so heavily upon the financial resources of the Charity.

It will be seen by the report of the Medical Committee that the total number of operations performed last year was 38,304, being 2,672 in excess of the previous year, and the highest on record since the opening of the Hospital.

In consequence of this increase in the number of cases treated, it has been found necessary, at the desire of the Medical Staff, to purchase six additional operating chairs at a cost of £30 to the Charity.

In consequence of the enlargement of the Hospital it has also been essential to provide a larger boiler for the hot-water apparatus, and to extend the hot-water pipes at a cost of £53 12s. 6d.

In conclusion, the Committee desire to place on record their obligations to the Medical Officers for the zeal they have shown in the performance of their duties, which has tended so much to the usefulness and prosperity of the Hospital during the past year; whilst to the Auditors their thanks are also due, for the trouble they have taken in auditing the accounts, a duty that each year becomes increasingly onerous.

The Committee are pleased to be able to assure the Governors of their continued confidence in the valuable services of their Secretary, Mr. J. Francis Pink. It is materially due to his exertions that they have been enabled to pay off so large a proportion of the debt. For his ability and zeal, by which the Charity has so greatly benefited, the Committee consider he is entitled to their best thanks.

The Report of the Medical Committee shows that the number of persons seeking advice at the Dental Hospital of London is steadily on the increase, and states that the work of the Hospital, in all its departments, has been carried on during the past year in a most satisfactory manner.

The summary of cases treated from Jannary 1st to December 31st, 1884, is as follows :—

Number of Patients		27,718
Extractions.	Children under 14	5,363
	Adults	10,845
	Under Nitrous Oxide	5,498
Gold Stoppings		2,266
White Foil ditto Plastic ditto		7,421
Irregularities of the Teeth, treated mechanically		1,663
Miscellaneous Cases		3,665
Advice Cases		1,583
	Total	38,304

In June, Mr. Coleman, finding it necessary for the benefit of his health to leave England for New Zealand, resigned the Lectureship on Dental Surgery and Pathology. This resignation was received with very deep regret, Mr. Coleman having intimately associated himself with the Hospital and Medical School during a long period of years. He had occupied from time to time many positions of importance, having held, in addition to his Lectureship, the posts of Assistant Surgeon and Senior Surgeon, and having fulfilled the duties of Anæsthetist on the morning of his attendance at the Hospital for a number of years. Mr. Coleman had also occupied the position of Chairman of the Medical Committee, and during his long connection with the Hospital he won the regard and esteem of his colleagues and all who were associated with him, and he carried with him to his new home the hearty good wish that he might have renewed health and continued prosperity in a new field of usefulness. Mr. S. J. Hutchinson was elected to the Lectureship thus made vacant.

The Members of the Medical Committee feel that much praise is due to the Students, who have most heartily co-operated with the Staff in all branches of the work. They also feel that special thanks are due to Mr. G. W. Parkinson for the trouble he has taken in having so efficiently organized and carried out a scheme for manufacturing nitrous oxide gas on the premises, by which there has been a very considerable saving of expense to the funds of this Charity.

In conclusion, the Medical Committee beg to express their thanks to the Managing Committee for their unvarying kindness and courtesy and ready acquiescence in all requests made to them from time to time by the Medical Committee in their endeavours to carry out efficiently the affairs of the Hospital.

THE VICTORIA DENTAL HOSPITAL, MANCHESTER.

The Annual Meeting of the Victoria Dental Hospital was held on February the 16th, in one of the committee rooms of the Manchester Town Hall, Lord Egerton of Tatton, one of the patrons, presiding. The first annual report stated that since March last, when the arrangements were completed to take over the assets and liabilities of the Manchester Dental Hospital, the hospital had met with considerable and continued success, and the poor were availing themselves more and more of the benefits it offered. The arrangements which had been made for keeping the hospital open for three evenings in the week had been much appreciated, the average evening attendance of patients having greatly exceeded that of the morning. The committee reported with regret that the annual subscriptions did not at present amount to quite £100, which sum was insufficient for carrying on the work in such a manner as they would desire, and as the character and objects of the charity seemed to require. They therefore earnestly appealed to the generosity of the public for its support and countenance. The report of the Dental Committee stated that from the opening of the hospital to the 31st December—a period of about ten months—the number of patients admitted had been 2,720. The treasurer's statement showed that the total receipts were £442. After the expenses of formation and establishment of the hospital, &c., there remained a balance in the banker's hands of £226.

The Chairman, in moving the adoption of the reports and financial statement, said the institution appeared to have encountered some difficulties at the outset, but these were now surmounted, and it was unnecessary that he should refer to them.

The hospital was in a thoroughly satisfactory condition, and appeared to be appreciated by those for whom it was intended —viz., the poor. The opening of the institution in the evening no doubt largely increased the work of the Dental staff, and it was gratifying to find that there was such a noble spirit of self-sacrifice amongst the members of the Dental profession generally on behalf of the deserving poor. He had no doubt, as the institution became better known, it would be a still greater tax upon their time and attention.

The meeting concluded with a vote of thanks to the chairman.

THE ODONTO-CHIRURGICAL SOCIETY.

The Anniversary Dinner of the Licentiates in Dental Surgery and members of the Odonto-Chirurgical Society was held on Friday evening, 13th March, in the Balmoral Hotel, Princes Street, Edinburgh. Mr. Robert Reid, L.D.S.Eng., occupied the chair, and Mr. Rees Price, L.D.S.Eng., officiated as croupier. Among those present were Dr. John Smith, President of the Royal College of Surgeons of Edinburgh, Dr. D. R. Haldane, Dr. Littlejohn, Dr. David Wilson, besides many local members—Dr. Williamson (Aberdeen), Mr. John A. Biggs (Glasgow), Messrs. W. Campbell and J. Fisher (Dundee), Mr. Norman MacQueen (Hamilton), Mr. Stirling (Ayr), &c.

The usual patriotic toasts having been given by the Chairman, Dr. Williamson, in proposing the toast of the "Dental Diploma," said he thought it was getting rather ancient in character, as it was now seven years since its possession was made essential for any one entering the profession, and about a quarter of a century since it came into existence; and in fact he understood that their annual meeting on the 13th of March was a sort of birthday celebration of the institution of the diploma by the English College of Surgeons.

It has been contended by some, with theoretical truth, that Dental surgery, being but a speciality of general surgery, should only be practised by those who had obtained the surgical degree. Suppose, then, one has obtained that degree, he is practically unqualified to practise dentistry, while one, who has passed the Dental curriculum, would be quite as prepared for his special work as the newly-fledged medical graduate is to enter on the duties of a General Practitioner. The Dental qualification was, therefore, the primary degree to be obtained, and, if time and opportunity permitted, the ordinary surgical or the higher fellowship might with advantage be added, as it gave the possessor a higher professional standing, and was the evidence of a wider range of general medical culture on the part of the holder. But however valuable the education of the head might be, that of the hands, to a certain extent at least, was almost more important, and should form the very commencement of Dental education, and be continued throughout the curriculum. This manual training would probably be developed more and more by the practical tendencies of modern teaching.

Dr. Littlejohn said, that as one of the guests, he took it as a great compliment to be called upon to propose the important toast of "The Odonto-Chirurgical and sister societies." He was sure no society had vindicated its position and its right to be well toasted more than this society, because it was a most flourishing society, and it had fulfilled its chief condition of existence—the advancement of the best scientific interests of the profession. He could not think of the Odonto-Chirurgical Society without remembering one who would have been present with them—Mr. Hepburn—if he had not been laid aside by illness. He coupled the toast with the name of their new President, Mr. Bowman Macleod. He could not imagine a society better suited with a president than on the present occasion. Mr. Macleod was the very embodiment of energy. He knew how to work not only his way in the world, but also to guide young bodies such as the Dental school on their onward course. He augured for the society during the current year a large measure of success.

Mr. Macleod said that it was always a pleasure to perform a duty, if the performance of that duty brought with it unalloyed pleasure. Such was the case in this instance, as the duty of replying to the toast of the Odonto-Chirurgical and sister societies had been imposed upon him by his election that day to the most honourable position of President of the Odonto-Chirurgical Society—an honour which he felt to be much beyond his deserts. What, however, rendered the pleasure unalloyed was that in reply he had to speak not only for their own society, but for those other societies throughout the kingdom which, like their own, had for their object the advancement of the profession in science and ethics. Dr. Littlejohn had humorously alluded to the dinner as a great feature in such societies. He, however, hoped that nobody would run away with the idea that they considered the dinner as of the first importance; they only viewed it in the light of its enabling them the better to give good and substantial service to the public, as it was admitted on every hand that without good meat you could not give good work. In the names of all the societies—from the Odontological of Great Britain, which was the oldest, to the Odontological of Birmingham, which was the youngest—he thanked them for their cordial good wishes.

The Croupier (Mr. Rees Price) said, it required few words to commend to them the toast of "The Licensing Bodies." Those corporations were of remote antiquity; they were indissolubly bound up in the past progress of medicine and in the education of its professors; and, above all, to the surgical corporations the Dental profession owed largely its present position.

We fitly commemorated to-day the establishment, some twenty-five years ago, of the Dental License by the College of Surgeons of England. This was a most important stone—the foundation stone—of the Dental edifice, of which the foundations were the establishment of the Odontological Society in 1856, and of the Dental Hospital of London in 1858. The building of the profession gradually proceeded, till in 1878, by the passing of the Dentists' Act, the whole profession was placed upon that footing which many of its individual members had obtained by means of the English license.

The crowning of this edifice was, without doubt, the act—at once graceful and courteous—of the College of Surgeons of Edinburgh, in placing at the disposal of the representative body of the Dental profession its magnificent suite of rooms. It seemed to him a fit consecration of the efforts of those who had worked so earnestly and laboriously in the interests of the Dental profession, and in the founding of the British Dental Association, that the deliberations of the latter body should take place in a building so rich in historical associations and so pregnant with memories of the past. But though the Dental edifice was completed externally, it was far from finished, and with the licensing bodies the future to a great extent rested. It must be a satisfaction to all to see the position which the College of Surgeons of Ireland took up last autumn in revising its curriculum. Though all would not agree with the College in substituting attendance at a public Dental laboratory for two years in place of three years' pupilage with a qualified Dental surgeon, yet it could not but be admitted that a distinct step forward had been made, in so far as the curriculum provided that there were three professional examinations through which the student must pass at different periods of his study.

In Scotland, at present, the candidate had the option of passing the two required examinations at the one time; but he hoped the day was not far distant when that option would be taken away, and that it would be compulsory upon the candidate to pass the examinations separately. Not only this, but that the first professional examination for the Dental license—the examination in anatomy, physiology and chemistry — would be equal in every respect to that required from the student for the general license. He coupled the toast with the name of Dr. Smith, who was well known, not only to Dental surgeons, but as President of the Royal College of Surgeons of Edinburgh, and as President of the British Dental Association. From his work on behalf of the Dental profession, he felt fully assured that the interests of the licensing bodies were in safe hands, well able to help them in what might be termed a struggle for existence with an Act of Parliament.

Dr. John Smith regretted the absence of Dr. Patrick Heron Watson, who was to have answered to this toast, but he fully appreciated the compliment and the kindly feeling which had been expressed towards the licensing boards by the body which was associated to them now by means of the Dental diploma. He referred to the important changes which had occurred during the year in the working of the licensing bodies, and said he believed all those changes had been for the better. He was sure they would agree with him in feeling a satisfaction that these bodies had been placed in a position much better than they ever enjoyed before. Changes were necessary in any of the progressive sciences, and changes in the examining and teaching bodies connected with these sciences were equally necessary; but the consideration of these required a great deal of prudence and time before they were accepted as wise changes, and changes which would be for the benefit of the licensing bodies. He would only further say that in the probable event of still further legislative changes being effected —of more parliamentary interference, which was very likely to occur, instead of what happened last year and the year before—it would be well and more seemly if Scotland, seeing the wider experience she had in educational matters generally, were consulted to a greater extent than she had been on the question of medical reform.

Dr. D. R. Haldane proposed "The Edinburgh Dental Hospital and School." He contrasted the facilities given now for practical instruction in medicine as compared with what they were when he commenced to study. At that time, he said, practical instruction was a thing unknown. Nowadays courses of lectures, instead of being the principal mode of teaching, were looked upon as comparatively unimportant. Real knowledge in medical subjects was obtained at practical classes.

Having referred to the Dentists' Act, he said that it was almost a necessary consequence that a Dental school should be established, and nowhere was a Dental school more necessary and more likely to prosper than in Edinburgh. Such a consummation had taken place. The Dental Hospital and School had been established, and was progressing in a most satisfactory manner. The scheme on which it was founded was certain to progress, and as Edinburgh had been so distinguished for its medical school in other respects, he had no doubt in the course of a few years the Dental school of Edinburgh would be equally distinguished.

Mr. Mackersy, the Hon. Sec., in the course of his reply, spoke of the necessity of enlarging their present accommodation at the hospital. The committee had considered the question of procuring a site and building a new hospital. He urged on them the propriety of helping in this scheme, and said if it were carried out it would be an ornament to the city and of immense importance to the profession, because it would be sufficient for the wants of Scotland.

Mr. John A. Biggs gave the toast of "The British Dental Association." He said the Association was beginning to assert itself in a very particular and efficient manner for the protection of the interests of the profession, and he failed to see how any registered dentist could afford to remain unconnected with it. He hoped the day was not far distant when one and all would band themselves together under its auspices for their mutual protection.

Dr. Smith, in replying, said he thought some alteration in the rules of the Association might advantageously be introduced, whereby no private individual—no dentist—should be called upon to perform so invidious a duty as to prosecute an irregular practitioner, because that action might be imputed to motives of professional jealousy. They knew how much Mr. Macleod had suffered in that respect; but he thought their Association should have a legal official for such a duty if it could not be performed by the Public Prosecutor.

Other toasts were given and responded to, and a very enjoyable and successful evening was spent.

THE ODONTOLOGICAL SOCIETY.

The ordinary monthly meeting of the above Society was held at 40, Leicester Square, on Monday evening, March 2nd, Mr. C. Spence-Bate, F.R.S., President, in the chair.

Mr. Oakley-Coles exhibited a new form of excising forceps.

Mr. Hutchinson (Curator) exhibited some very interesting specimens received for the Museum from Mr. White, of Norwich, being a very fine fossil skull of an extinct shark which had been dug up near Felixstowe, and a skull of a ray.

Mr. Hern mentioned particulars of a case in which the superior maxilla had been removed in July last, and had since been treated an artificial case filling up the necessary parts having been made.

Mr. Oakley-Coles remarked, with regard to the case mentioned by Mr. Hern, that he had had several cases similar to that one, and had found that it was a very difficult matter to prop up the eyeball in these deformities. In fact, from the variety of cases which had come under his notice, he had come to the conclusion that it was a perfectly hopeless task to attempt to restore the eye to its natural position by any mechanical appliance.

With regard to making such instruments in vulcanite, he considered that celluloid for such purposes was far preferable.

Mr. Coles had used in a case, some years ago, a material called dextrine for the outer covering. That material had answered very well, the only disadvantage being the distension of the material when the patient snorted.

Mr. J. S. Turner thought that the leading thing to be considered in such cases was that proper attention should be given to the restoring of the normal condition of the air passages. Many patients died from bronchitis and pneumonia from cold air passing too freely down into the lungs, and the remedying of this was of far greater importance than the outward appearance of the patient.

Mr. S. Bennett said that all members who were using Dr. Herbst's method of filling teeth with gold were aware of the annoyance caused by the steel burnishers becoming coated with gold a little time after use. Dr. Bödecker, of New York, had suggested agate burnishers as a means of getting over the difficulty, and he (Mr. Bennett) had had made an improved form of agate burnishers, with which he had been very successful.

Mr. C. S. Tomes thought that as there was a difficulty in getting small agate burnishers made, that mineral tooth-body would be a good substitute. He had made one himself, though imperfectly, by grinding up an old tooth and inserting it into a needle chuck. This he had found to answer very well.

Mr. Charlesworth, F.G.S., then read his paper "On the Fossil Teeth of Extinct Animals in the Museum of the Odontological Society, with remarks on the value of Dental characters in the determination of Life Periods in the Ancient Fauna of the Globe."

The meeting then adjourned.

THE DENTAL MANUFACTURING COMPANY.

The Annual General Meeting of the shareholders of this company was held at the Company's Registered Offices, 3, 4 and 5, Little Windmill Street, Golden Square, London, W., on Saturday, March 7th, 1885, at 2.30 p.m.

The Chairman (Mr. D. D. Hepburn) in moving the adoption of the Report, said he considered it as a whole very satisfactory. Trade in the country had not made any improvement during the past year, and most trading companies, including our great railway lines, were paying reduced dividends. Our own company, notwithstanding the general depression, had increased its business during the year, which he thought was highly satisfactory. Their present premises had permitted, and would still permit, of a considerable extension of the business, and now that the outlay had been made, every increase would bring them larger profit, especially if it were in goods of their own manufacture. This was an important point, and during the past year the directors had, as would be seen from the report, made a further outlay in this direction. At the suggestion of their manager, Mr. Brewster, certain workmen were engaged and expenses incurred in the extension of their factory, which, from the result now on the table before them, must prove highly remunerative to the company. The *Dental Record* he was pleased to state, retained its prestige in all things pertaining to the dental profession. Great care is taken in the selection of fitting matter for insertion ; original and valuable papers continue to be sent to the editor for publication, and all subjects of importance to the profession have careful consideration. Shareholders, he hoped, would assist in increasing the circulation of so valuable a publication. Looking then at the full statement of the affairs of the company, it would be seen that it had attained a high and strong position ; it has large and suitable premises, an increased means of production, a zealous and efficient manager, and a good working, loyal staff, all fitted for an increasing business. It would be seen from the balance sheet that the proportion of debts owing to the company, as compared with the sales, did not decrease ; he would again remind shareholders that they cannot have the *full* advantages of the co-operative system of business unless the principle of ready money is more nearly carried out—at least they would ask from their shareholders promptness in settlement of accounts when rendered ; he was pleased to state that many shareholders were most prompt in this respect, but there were still a large number who were not so. In view of some withdrawals from the loans, and the desire of the board to reduce some of its outstanding liabilities, at the same time leaving sufficient capital at command for extensions without unduly interfering with the regular carrying on of the business, it has been decided to make a call of £2 per share—this makes £18 per share called up, the previous call being made in 1879. A dividend of 5 per cent per annum was declared.

Dr. Crapper, the managing director, seconded the adoption of the report, and said that it gave him great pleasure to do so, he had not much to say in the matter, as the chairman had placed everything so fairly and honestly before them. He agreed with the chairman that the exceptional outlay of the present year would soon be turned to good account, they had been enabled to see to-day what that outlay promised to produce, there was no doubting the fact that the company's own manufactures were in greater demand every year, the aim of the directors being to produce the *best* of everything, at the same time selling at the cheapest possible rate consistent with quality. As their Chairman had said, the dividend would have been 7 per cent. this year, had they not deemed it desirable to avail themselves of the opportunity presented for increasing the means of manufacture; and it was in looking ahead that the directors saw the necessity for making the call which had been referred to.

Dr. Wormald supported the adoption of the Report, and pointed out that the discounts allowed to shareholders during the year reached an amount equal to a 2 per cent. dividend; as one speaker had remarked the company's supplying goods at low prices was equal to a dividend, with this he agreed. It would be remembered that the company instigated the movement which is now being followed to a partial extent by the leading dental houses, viz,, to give a substantial discount for cash. Unless shareholders examined carefully their accounts, they would scarcely realize what a 10 per cent. discount on their teeth and sundry goods really meant; many of the smaller shareholders had, he believed, long since received back in discounts and dividends the amount paid on their shares. He regretted he could not see some way of reducing the amount of clerical work. He had lately a conversation with their Auditor, a gentleman with a large and varied experience, but he could point out no way of reducing the work, in fact he described it as "enormous for the turnover." Referring to the remark of a previous speaker as to the advisability of making calls, it was suggested some years since to call up sufficient capital to pay off Dr. Crapper in one sum, they had, however, not done that, but preferred paying the amount off by degrees. There was only a balance of £750 remaining, and this sum would, he hoped, be paid during the year. In conclusion, he considered that to pay away nearly £600 in discounts, partly pay off old liabilities, and to spend a sum equal to a 2 per cent. dividend on the factory, and then to declare a 5 per cent. dividend, gave good cause for congratulation.

The adoption of the Report was then put to the meeting, and carried unanimously.

Mr. George Gregson and Mr. Lawrence Read were elected directors for the ensuing year.

The Chairman, in returning thanks for the vote of confidence and for the increase in their remuneration, said, that he could assure them that the Board had all given their best attention to the affairs of the company, and he thought few concerns had so successfully and rapidly risen as theirs.

The Chairman then proposed a vote of thanks to their employés, and referred in the highest terms to their indefatigable manager and secretary, Mr. Brewster. He also spoke with pleasure of the way in which all had worked to make up the sad loss sustained in the death of Mr. Audley in London and Mr. R. A. Howell in Manchester, young men of the highest integrity, and who were held in the utmost esteem by all who knew them. It was a sincere cause for congratulation that their manager, who had at one time during the year been so ill, was now as well and hearty as ever.

Dr. Crapper, in seconding the resolution, regretted that they should have to record the death of two such valued men in one year, they were losses not easily replaced, and he hoped the time was far distant before another breach would take place in their ranks.

Mr. G. Gregson said he wished to add a few words to the vote. He felt sure no one could have done more for the company than Mr. Brewster had, both in the general business and in the manufactory, and his perseverance had resulted in the improved manufactures they saw before them.

Mr. Brewster, in reply, said it was really very gratifying to hear that the efforts of himself and fellow-workers were held in such high esteem. He was sure the kind vote recorded would but act as a stimulant to further efforts for the company's good.

Votes of thanks to the Secretary, employés, and to the Chairman, closed the proceedings.

JOURNALISTIC SUMMARY.

THE INDEPENDENT PRACTITIONER. *(January, NEW YORK.)*

At the July meeting of the Pennsylvania State Dental Society, Dr. W. B. Miller exhibited an arrangement he had devised for MIXING AMALGAM. He had been in the habit of mixing it in his hand, but fearing that a feeling of uneasiness he had in his arm might he due in some way to the mercury, endeavoured in the device to imitate as nearly as possible the palm of the hand and a finger. He took a block of rubber, such as stationers sell for erasing lead-pencil marks, and securing it in the lathe, first with a chisel, and then with a cloth wet with chloroform pressed against it while it was revolving rapidly, moulded it into the shape of a small mortar. The edges were then turned until it fitted tightly in a rubber case, such as is used to cover the magnet of a telegraph sounder. To the other end of the case he fitted a flat disc of glass, filling the space between them with plaster. On this he mixes the phosphate and other cements. For a muller, in mixing amalgam, he uses the rubber tip of a lead-pencil. He thinks that the soft rubber takes hold of the amalgam better, mixing it more thoroughly and quickly than a porcelain mortar.

INDEPENDENT PRACTITIONER. *(March, NEW YORK.)*

"TREATMENT OF DEFECTIVE TEETH DURING PREGNANCY," by Dr. C. A. Marvin. The writer advocates temporizing preventive treatment—treatment for the prevention of further damage for the time being. A defective tooth in the mouth of a pregnant woman of nervous temperament, is a delicate thing to handle if one would reap good results. Better a hundred times treat it delicately and temporarily than to take a risk so great. Both sides of the argument are in favor of this decision. A temporary filling will preserve the tooth as well as any other for the time being, and it cannot do any harm. Even if the tooth could be treated permanently without danger, no harm is done it by the temporary treatment. The tooth is saved, and can be permanently filled at a future time just as well as now; the patient is relieved both from anxiety and suffering, and everybody is happy.

"DENTAL JURISPRUDENCE," by Dr. J. Allen Osmun. There have been times without number when dentists have been in court, either as plaintiff or defendant, in suits of all descriptions. In fact, a superficial observer would be surprised to discover the close relationship existing between the two sciences of law and medicine. Let me recall a few cases where this is true; where life has been lost under the influence of anæsthesia; where injuries have been inflicted from unskilled operations; where diseases of the oral cavity have been improperly handled; where testimony has been needed to identify remains from accident or suicide; where serious charges of attempted assaults of a sexual character while under anæsthesia have been made; of the question and legality of fees and payment thereof. It were easy to multiply cases in illustration of this nature, but the foregoing will suffice to show something of the importance of this subject.

I am led to suggest that the very first case that a young practitioner could have might involve these very principles, and it, of course, is liable to come to any of us, at any moment.

When called into court as a witness, you will often find that your testimony will be opposed by others engaged by the other party to the suit. Then it will be of great importance to your side if your evidence can be substantiated by indisputable proofs, drawn from sources that admit of no question.

"COCAINE HYDROCHLORATE," by Dr. A. M. Ross. I believe that the most satisfactory *immediate* results can be obtained from the hypodermic injection of a two or four per cent. solution, and this I tried in one case: but the subsequent result in the tissues of the infra-orbital region of the cheek, the tip of the nose, and the same side of the upper lip were interesting, to be sure, but rather disappointing to me and highly discouraging to the patient. There was twitching of the affected muscles more or less continuous for twelve hours, and a very annoying tingling sensation through the parts, followed by considerable soreness, which was most marked near the infra-orbital foramen, and a slight discolouration of the surface over this locality, that lasted two days. The solution that was used in this case was four per cent., freshly prepared and filtered, and it contained no antiseptic, or anything excepting cocaine, and I do not think a particle of air was introduced with the solution. According to the graduations on the syringe about six minims were introduced. A portion of this same solution had been used a day or two previously in a case of tenesmus, with the best results: a case that could be controlled and treated in no way without some anæsthetic, and there followed no unfavourable reaction from the use of cocaine.

Dr. W. H. Trueman describes an "ELECTRIC LAMP FOR THE MOUTH." A wooden case encloses the bulb, leaving a space of one-eighth of an inch between the wood and the glass, which is packed with asbestos; a hole three-eighths of an inch in diameter is made in the case directly opposite the carbon loop, through which the light passes. The non-conducting case was suggested by the heat developed when the lamp was in operation. It not only protects the lamp from accident, but also preserves the patient from injury should it come in contact with sensitive tissues, or accidentally break while in the mouth. He suggests that all lamps for use in the mouth should be provided with a switch in the handle, so that the lamp may be lighted only when actually needed.

THE DENTAL REGISTER. *(CINCINATTI, January).*

"PROTECTION OF THE CERVICAL BORDER," by Dr. Lewis Ottofy. The proper filling of the Cervical Border in difficult and inaccessible positions, has probably given most of us more inconvenience than any other operation performed by the Dentist. Some of our most prominent practitioners thought that the acme of dentistry was reached when they were able to manipulate gold with such skill, that a tooth could be filled with it from the top of its apex to the most exposed surface of its crown. A few years' practice readily determined that in order to fill a root canal properly, gold is probably one of the poorest materials at our command; and, though it does not seem so high-sounding, it proves more satisfactory when we can say, "This root is filled with gutta percha." So is it with the filling of cervical walls; gold is one of the poorest substances, in many cases, to which we can resort as a filling material. Where there are frail soft cervical borders extending somewhat under the gum, and in most cases where decay does not extend under the gum (where the enamel is hard or at least medium), gold foil used alone proves very satisfactory; but it is almost always necessary, when foil is so used, that it should be in the form of what is known as soft foil. In a great many instances other substances will prove to be much more satisfactory than gold, and one of these is tinfoil; amalgam is another material which proves very satisfactory in hidden, inaccessible cervical borders, especially in such where, from reasons well known to you, it is impossible to obtain a firm basis where from to build up with gold. Sullivan's cement, when hard, oxidizes very much and turns very black, but the therapeutic effect of the oxide is one of the points in its favour; and though my experience with it has as yet been limited, yet it is sufficiently satisfactory to warrant its use.

"PRESIDENT'S ADDRESS BEFORE THE NORTH WESTERN DENTAL ASSOCIATION." As American Dentists we stand as yet abroad, as well as at home, at the head of dentistry. In no country has our profession developed such an amount of inventive genius, scholarly attainment, and operative success, as in the United States. No country has taken such an advanced position as this in so far as the facilities for teaching are concerned. But this country cannot in the future retain the first rank as a Dental educator unless more stringent examinations are held. The idea that graduation is easy is becoming so universally taken as a matter of fact, that in some localities a quack of any sort is referred to as an American Dentist. More stringent laws to govern established schools and to limit their powers, or to increase the rates and branches of State examination boards, are urgently needed. The fact of so many sham colleges existing in our country in the past years, has also led to the above result. The aspect, so far as legislation is concerned, is more favourable, and to keep pace with similar movements in foreign countries must continue so uninterruptedly.

"OPERATIVE DENTISTRY," by Dr. Lewis Ottofy. There are numerous answers to the question, "Why do fillings fail?" most of which are true in their general way, perhaps, aside from pure carelessness. First, neglecting to properly protect the cervical border of a cavity; second, the matter of selecting the proper material, are the main causes of hundreds of failures. It is my conviction that our failure in filling can be materially decreased,—first, by performing all our operations, whatever the material used, carefully and thoroughly; second, wherever the cervical border to a cavity exists, let it receive twice the care of the previous case; third, use just the material for the case.

A singular case is recorded by Dr. J. R. Thomas, of a young man about twenty years of age on whose gum, opposite the root of the second upper bicuspid on the right side, there was present what seemed to be a small superficial aphthous ulcer, which had given little or no pain or inconvenience. The tooth appeared perfectly sound; it was touched with tincture of iodine, and this led to its enlargement and more aggravated appearance. The pulp chamber was opened by drilling through the masticating surface; the drill, after passing a little way, sank suddenly into what seemed to be a large cavity, much larger than a normal pulp chamber, the walls of which were much softened, and communication between this cavity and the canal in the root was completely shut off by a layer of dentine. The contents of the cavity were of an offensive, vitiated character, similar to the *débris* of dead pulp. As there was considerable difficulty in gaining access to the pulp canal, the tooth was extracted and split open; the contents of the root canal consisted of the *débris* of the dead pulp of that part. That the living pulp in the root should have formed for itself a covering and protection against the *débris* of dead pulp in the crown is certainly very remarkable. The fact that the pulp formed such an effectual shield for itself against the offensive matter in the crown is an illustration of the great activity and the reparative power of this organ.

A correspondent, writing on "THE ENGLISH PRACTICE OF DENTAL SURGERY," says that he has seen but very few attempts at contour work, which has invariably been performed by a few London dentists. In regard to the treatment of exposed pulps, devitalized teeth, &c., they know practically nothing. Should a pulp die, they in all probability will erect an amalgam monument over it. He believes there are only five or six English dentists who conscientiously go to work to save devitalized teeth. They are meeting with fair success. He promises more observations anon. The promise is fulfilled in the March number, "Prosthetic Dentistry" being the subject of his observations.

DENTAL COSMOS. *(March, PHILADELPHIA.)*

"MOLECULAR STRUCTURE AND FORCE, WITH REFERENCE TO NUTRITION," by Dr. J. L. Williams.

"THE INEXPEDIENCY OF FILING TEETH, AND THE ADVANTAGE OF RESTORING CONTOUR," by Dr. E. A. Bogue. In presenting to you the separator, I wished only to say that it would serve to slightly separate certain teeth and hold them steadily while they were being filled. If these teeth have been previously separated by cotton, tape or other means, the separator holds them firmly during the operation without the least pain, after it has been once adjusted. When the filling is ended, another turn or so is given to the screw to obtain room enough to polish the fillings without removing those points which ought to touch each other when finished. There are certainly teeth which cannot be separated with this instrument, but as it may frequently be needed, and as it generally causes no pain, but sometimes even prevents the extreme tenderness which follows the gradual separation of teeth, it will without doubt soon be accepted by those who desire as far as possible to spare pain to their patients.

Judging from my own experience, I should conclude that the filing of teeth, as it has been and still is practiced among the mass of practitioners, is a bungling mode of obtaining room for delicate operations.

Suppose, for example, two cavities opposite to each other, between the first molar and the second bicuspid. We can with a chisel or with a burr in the engine open a hole in the grinding surface of one of the teeth, which shall expose perfectly the two cavities. This leaves the two sides adjoining the cavities in both teeth intact. If the cavities are near the gums, we can make our entrance from the buccal side, being careful to make the largest opening in the tooth which is most decayed. Sometimes it will be necessary, in order to obtain complete access, to cut both teeth, but generally one will be enough. Between the incisors and cuspids a little separation should generally be made with cotton or tape during three or four days before the operation. Then, if the cavities are large, the teeth may be cut upon the linguo-approximal surfaces in such manner that the labial surfaces are not touched, and the fillings, being inserted from the lingual side, are not visible from the front. If the cavites are small, we separate the teeth with tape or other means until there is enough space to work in without cutting at all. These examples are the general rule, for all the others are only modifications of these.

Now, having prepared the cavities, if we make use of a little wooden wedge between the two teeth, or the separator, which would be less painful to the gums than the pressure of the wood, we can fill with whatever material we choose without harming the original form of the teeth. If we use amalgam or other plastic filling, we have only to put a small piece of thin platinum between the teeth to prevent the two fillings from uniting, taking it out the following day ; then with a thin tape, waxed and dipped into some kind of powder, we can polish and shape these fillings in such a way as to increase their durability and the comfort of the patient very greatly.

Among the incidents of office practice recorded at the December meeting of the New York Odontological Society, Dr. J. Smith-Dodge, Jr. said there is one use of cocaine that so promptly approves itself that I take the opportunity to suggest it to any of you who have not thought of it. We frequently have to do a little violence to the borders of the gums, and I have found that, by simply giving the gum a bath of the four per cent. solution of cocaine, you can put on the rubber dam and work it up with ligatures to your heart's content without causing pain. In the same way, trimming off the cervical border of approximal fillings, from being, with many patients, one of the most objectionable features of the operation, becomes painless. This is quite on a line with the use that surgeons have made of the drug. It renders these operations so comfortable to the patient and delightful to the operator that, the other day as I was using it again in that way, it occurred to me that I would mention it here.

"STEAM, AND ITS EFFECT ON RUBBER AND CELLULOID WHEN PROPERLY APPLIED," was the subject of a paper, by Dr. F. W. Seabury. Rubber manufacturers have always been experimenting to get dry or super-heated steam, it being a good conductor of heat and a very mild fluid. With the water-bath vulcanizers now in use, it is impossible to distinguish a pure, clean rubber, from one of low-grade stock, loaded with dirt and pigments. When the several red dental rubbers now on the market are vulcanized in the usual way, in a Whitney or pot vulcanizer, they have to be marked before they are put in to vulcanize, in order to distinguish them when taken out. Intelligent experiments cannot be conducted with a Whitney vulcanizer, or with one constructed on the same principle.

The first thing to do, then, is to get a process of vulcanizing which will develop the color. It has been known for years that this could be accomplished by keeping the rubber absolutely dry, by sealing with tin-foil, baking in a hot air chamber, or curing with super-heated steam. When rubber shrinks, it is either because it has not been properly seasoned, both after washing and after mixing, or it has been packed and vulcanized in a water-bath. The water will separate the rubber from the teeth every time, so that one can get the shrinkage only in a dry oven. Super-heated steam, applied instantly, is the perfect medium for conducting heat to rubber, because it gives the best color and preserves the elasticity of the rubber. Being a rarefied gas, the indicated is always the actual temperature for all parts of the oven, and rubber need never be burned or made granular or porous. That is to say, in order to vulcanize rubber properly, the steam generator must be separate from the vulcanizing chamber, so that the high-pressure steam can come into the chamber instantly, to produce pressure before the heat can be communicated to the rubber.

To harden dental rubber appears a simple matter enough; but to do it so that it may maintain its best qualities is more difficult than most persons suppose, and a large proportion of the rubber dentures manufactured are either over-steamed or insufficiently hardened. For this there are several reasons: First, it is found that as the pressure of steam in water increases the conducting power decreases, and the heat tends to accumulate near the point of application: Second, the air in the top of the vulcanizing chamber protects the thermometer from the steam, as air, when still, is a non-conductor. Wildman, by opening a safety-valve in the top of the Whitney vulcanizer, thus causing a circulation, increased the indicated pressure thirty-five pounds to the square inch. Rubber manufacturers, when vulcanizing, keep blowing off steam, thereby causing a circulation and equality of heat in all parts of their long ovens: Third, when water comes in contact with rubber, it destroys the color, makes it soft and porous, and also prevents it from adhering to the teeth.

All authorities agree that to get the best results when vulcanizing rubber the temperature of the vulcanizing chamber should be gradually and slowly raised. My process is just the opposite. I commence with dry steam, at high pressure and high temperature, and I claim that rubber cured in this way is tougher, takes a higher polish, and makes a closer union with the teeth; produces a lighter and brighter color, and requires less time to vulcanize and finish.

Dr. W. George Beers, of Montreal, read a paper on "The Teeth of Children."

THE DENTAL HEADLIGHT. *(January, NASHVILLE.)*

The editorial article is upon "THE VALUE OF CLINICAL NOTES." It has been a source of surprise to us that so few dentists seem to appreciate the importance of recording their clinical experience.

Cases of peculiar interest will occur, even in the most ordinary practice. From data thus obtained and accurately noted, facts could occasionally be drawn to refresh the mind when similar cases presented, or by comparison with previous cases, valuable conclusions deduced as to the best treatment in the premises.

As no two persons are exactly alike, so no two cases in practice are precisely similar, but there is always involved certain cardinal principles which govern all cases alike; the modifying influences are, of course, to be duly considered.

History is but the recorded facts of the past, and our present knowledge of the grand science of Dentistry is due to the faithful record of a few of our predecessors, and shall we neglect to bequeath to posterity the experience we have so richly enjoyed?

The value of clinical notes would also be realized at the meeting of the Dental Societies; a subject being opened for discussion, or, as is the custom usually, being announced in advance, those who keep notes are with little difficulty prepared to intelligently discuss important subjects, and are not compelled to fire at random and with consequent inaccuracy, as is too often the case at such conventions.

And finally, such notes would constitute the basis for the elaboration of acceptable papers to be contributed to the journals of the country, for the edification of the dentist.

To record and publish his experience is plainly a duty which every one owes to his profession and to humanity.

CODE OF DENTAL ETHICS.

The following is the published Code of Ethics of the American Dental Association:—

Article I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

Sec. 1.—The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are, in most cases, unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients; and even the simplest case committed to his care should receive that attention which is due to any operation performed on living, sensitive tissue.

Sec. 2.—It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavouring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success where, in the nature of the case, there is uncertainty.

Sec. 3.—The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

Article II.

MAINTAINING PROFESSIONAL CHARACTER.

Sec. 1.—A member of the Dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to discredit or dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors ; the aged special encouragement to their juniors.

Sec. 2.—The person and office arrangements of the dentist should indicate that he is a gentleman ; and he should sustain a high-toned moral character.

Sec. 3.—It is unprofessional to resort to public advertisements, such as cards, hand-bills, posters, or signs calling attention to peculiar styles of work, prices for services, special modes of operating, or to claim superiority over neighbouring practitioners; to publish reports of cases, or certificates in the public prints; to go from house to house soliciting or performing operations; to circulate or recommend nostrums, or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by card, simply their names, occupation, and place of business; or in the same manner to announce their removal, absence from, or return to business; or to issue to their patients appointment cards having a fee bill for professional services thereon.

Sec. 4.—When consulted by the patient of another practitioner the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him; and, if the interests of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

Sec. 5.—When general rules shall have been adopted by members of the profession practising in the same localities in relation to fees, it is unprofessional and dishonorable to depart from these rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations or work as an inducement to patronage.

Article III.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the Dental organs and the mouth. With these he should be more familiar than the general practitioner is expected to be; and, while he recognises the superiority of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty. Where this principle governs there can be no conflict, or even diversity, of professional interests.

Article IV.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and at the same time the best judges, of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and the many other benefits conferred by the competent and honorable dentist, the profession is entitled to the confidence and respect of the public, who should always discriminate in favour of the true man of science and integrity, and against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way, without proper remuneration.

Editorial.

PROSECUTION UNDER THE DENTISTS' ACT.

THE British Dental Association has again been successful in a legal prosecution of an offender against the Dentists' Act. The case is reported at page 163. This is another instance of the good work done by the Association. Though a great many cases of infringement of the Act have been taken up by the Association, all that has been accomplished has not come before the notice of the public. The representations made by the honorary secretary have frequently been followed by a discontinuance of illegal practice. Yet, withal, there are still existing many examples of offence against the Dentists' Act. Information of such must come almost entirely from the legitimate members of the profession. The information which is supplied should not be merely an evasive advertisement, but rather of the nature of reliable and useful evidence. Doubtless the representative Board would prosecute in more of the existing cases of illegal practice if definite and legal evidence were to hand. To obtain that is the difficulty.

GOSSIP.

THE portrait of John Tomes, Esq., F.R.S., F.R.C.S., by C. H. Macartney, has been engraved in mezzotint, by Gerald P. Robinson. Proof impressions, with autograph, are to be obtained at one guinea each, and are to be seen at the Dental Hospital, Leicester Square, and at 47B, New Bond Street, W.

"THE Power of the Future" is being discussed by German engineers as liquefied carbonic acid.

DURING the January sittings of the Examiners of the Royal College of Surgeons, Edinburgh, the following gentlemen passed their first professional examination for the License in Dental Surgery:—Frank Hampton Goffe, Birmingham; and John Gardiner Fraser, Caithness. Mr. Goffe also passed his final examination, and was admitted L.D.S.Edinburgh.

In a criticism before the American Association on the subject of Heredity, Professor A. Hyatt mentioned the case of a man who resembled his mother on one side of his body, and his father on the other.

Mr. Chas. Glassington, M.R.C.S., L.D.S.Edin., has been appointed Lecturer on Dental Materia Medica at the National Dental College.

A Correspondent writes that he is often at a loss to understand how it is that there is such a difference in the number of cases a gas-bottle will run. He is careful to keep a record of every bag of gas used, and find some bottles will give three times the number of bags others do, which makes it difficult to say, without weighing, what gas you have left.

The next meeting of the Odontological Society will take place on Monday, April 13th. Paper: "On Diseases and Injuries of the Jaws in Wild Animals," by J. Bland Sutton, F.R.C.S. Casual communications by Messrs. Newland Pedley, W. A. Hunt, F. Henri Weiss and A. S. Underwood.

Mr. F. A. Huet has been elected an Associate of the Manchester Literary and Philosophical Society.

It has been decided to have a section of Dental and Oral Surgery at the International Medical Congress, to be held in Washington, U.S.A., next year. Professor Taft has been named as President of the section.

The International Inventions Exhibition at South Kensington will open on May 4th.

The inhabitants of New Ireland (South Pacific) are assumed to be descendants of remote but superior races, and to retain inherited powers which have become weak by lack of use, and that those moral and intellectual powers can be easily restored. The men, says Mr. A. J. Duffield, in a paper read before the Authropological Institute, go absolutely nude, but the women wear "aprons" of grass, before and behind, bleach their hair, and paint and tattoo their bodies.

A LOUD-SPEAKING telephone, which was heard without difficulty throughout the amphitheatre, was recently exhibited at the Conservatoire des Arts et Métiers.

PROFESSOR MIKULICZ, of Cracow, remarks that the fate which has befallen transfusion of blood is most remarkable. So highly prized not long since by Hueter and Neudörfer, it is now almost unanimously regarded as directly mischievous, and the saline solutions everywhere take its place. Professor Mikulicz prefers the solution of six parts of chloride of sodium and one part of the carbonate in 1,000 parts of water. He has employed it twice with the best results; and recommends that its use should be made compulsory in acute anæmia from loss of blood.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, from Feb. 1st to Feb. 28th, 1885:—

		National.	London.
Number of Patients attended		1,564	—
Extractions	Children under 14	391	372
	Adults	488	816
	Under Nitrous Oxide	420	430
Gold Stoppings		56	240
Other Stoppings		643	790
Advice and Scaling		267	142
Irregularities of the Teeth		194	191
Miscellaneous		163	396
Total		2,622	3,377

THE "*Dentists' Register*, 1885," has recently been issued. The synopsis shows that the practitioners without a qualification have decreased in number, and those with qualifications have increased. In the first *Register*, published in 1879, the former numbered 4,756, whereas in the current *Register* there are 4,395—a reduction of 361. There are still several Licentiates in Dental Surgery who have not registered their degree.

SIR WILLIAM JENNER, K.C.B., M.D., has, for the fifth time, been elected President of the Royal College of Physicians.

THE

DENTAL RECORD.

VOL. V. MAY 1, 1885. No. 5.

CASE OF PARALYSIS AFTER TOOTH EXTRACTION.

By CHAS. W. GLASSINGTON, M.R.C.S., L.D.S.Edin.

H. E., aged 27, surgeon Royal Navy, was seen by me twelve months ago, when I extracted the wisdom tooth of the right side of the lower jaw. This was followed by loss of sensation along gums and wedge-shape piece of lip, extending from region of mental foramen towards the centre and outwards towards the angle. He was unable to distinguish hot from cold, or able to feel any sensation on pricking. On pulling a hair some sensation could be felt in lower part, and on putting a cup to the lip the characteristic feeling as if it were broken was noticed. The treatment consisted of using the battery for two months, when sensation recurred. The patient told me the same thing had occurred five years previously, when the second lower molar of the right side was extracted. The treatment was the same, but it was three months before sensation returned. On February 19th, 1885, the wisdom tooth on the left side was extracted by Mr. Tuck, of Chichester, and was followed by paralysis of that side. Up to March 3rd, sensation has not returned, but there is occasional tingling.

REMARKS.—Fortunately for the Dental surgeon, it is not frequent that he meets with a case like the above. I have heard of paralysis of sensation after removal of the wisdom tooth, but not after the second molar. As regards the cause, might it not be due to one of two things?

1st. The inferior Dental nerve in close contact with the tooth, or

2nd. Displacement of the nerve by being placed in a position so that it runs parallel to fangs instead of below, and the filaments to the teeth coming from the bottom of the trunk, instead of the top, so that on extraction of the tooth the filament, instead of being ruptured, is torn away from the trunk.

DENTAL MECHANICS.

A Paper read before the Students' Society, National Dental Hospital.

By F. C. Wright.

Mr. President and Gentlemen,—In saying a few words upon this most important subject, I do not wish any of you to be under the impression that I am about to do my best to tell you how to make an artificial denture or anything pertaining to dentistry, as I sincerely trust that all to whom I have the privilege of reading this paper are a good deal more conversant in that respect than I am myself; but in honouring me by discussing the few remarks I shall make this evening, I hope it will, in some measure, tend to elevate that portion of our profession which I have chosen for my subject for this Society.

A subject like this, as I daresay most of you are aware, is inexhaustible. Even that portion which is strictly dental mechanics seems to be endless, with the innumerable methods of manufacture and attachment by the older or more recent theory and practice of applying those lost organs of mastication which are so thoroughly essential for health, appearance, speech, etc.

The great improvements that have taken place in the manufacture of artificial dentures within the last twenty-five years you must all admit; although, when I say improvements, I think I ought to limit myself, with some few exceptions, to the improvement in the methods of manufacture and the facility with which work can be done, and not to the greater perfection of the work itself, which certainly ought to be the case, considering the very much greater advantage dentists now have over those of but a few years ago.

I would not for a moment wish any of you to think I am endeavouring to underrate or condemn in the least degree all the work done at the present time, as there is not the least doubt but what there are a great many dentists conscientious enough to see that all their work is thoroughly well done, and that good materials only are used; yet, judging from the work that we see almost every week, there is not much doubt but what there is a great majority who have not the least respect for their patients as far as the quality of the work is concerned, and as long as it will hold together for a few months they—"the dentists" (?)—are quite satisfied, and apparently the more wires there are attached, and in such a manner that they should be extremely detrimental to the retention in the mouth of those natural teeth which they encircle, the better they like it. I do not think that, looking at two-thirds of the work done at the present day (from a work of art point of view) that it is in the least degree comparable with that done years ago. I am not limiting myself to bone dentures, when it meant work, when it was necessary to chip and file at a great block of ivory, and ultimately, after three or four days' hard work, have before you a set of teeth of which the dentist might well be proud; but the plate work, even that is in many respects inferior to the plate work of years ago; and in my own mind I feel certain that the mechanical part of our profession has deteriorated to a very great degree—so low, in fact, that I do not think it can be very much worse.

Perhaps one reason that might be given for this deterioration is to be found in the rapidity of working to what it used to be. Who would think now of devoting four or five days to the manufacture of a set of teeth? Why, in a great many places, where tolerably good work is done, and fees obtained for it that are not very much, if any, less than they used to be, if an assistant took very many more than that number of hours to make the set, he would stand a first-class chance of having to take a compulsory holiday until he could get another berth where work was not so rapidly done.

This deterioration is not due to the dentists and assistants not being such good mechanics as in former years, as in a great many cases they are, and perhaps even better than they used to be; but it is in some degree owing to the fact that dentists, like most men, are under the impression that they cannot earn money fast enough; they do not like to see a case about the workroom for more than a few hours, or they do not think it pays, so consequently, the work is rushed off, not more than a third the time devoted to it than there ought to be, and inferior work is the result.

What sort of work can you reasonably expect to find done at dentists where such a notice as this confronts you? "Artificial teeth equal to nature made and fitted in while you wait." But this rapidity of working is the result of the introduction of vulcanite as a base for artificial teeth, and this in my mind was the primary cause of the downfall in our mechanics.

The merits of vulcanite are certainly undoubted, as of course it entirely superseded the old ivory dentures which were so objectionable in many respects, perhaps principally on account of their non-durability, as even those made from the tusk of the hippopotamus, which is of very much firmer texture than that obtained from other animals, it being covered with a hard thick enamel. Even this, however, soon changes colour, assuming all sorts of hues, and when in this state is very liable to decay. So you see that if it were only in abolishing this material for artificial teeth, vulcanite was indeed an invaluable introduction both to the patient and dentist, as it is entirely free from those objections, and also from another which is of the greatest importance, which is in itself sufficient to place it far in front of ivory, and that is, it is not to any great extent acted upon by the acids of the mouth, whereas the ivory dentures after having been worn for only a few hours became completely saturated, such was its propensity for absorbing the fluids of the mouth, so that consequently they became extremely offensive. So I think that, if only doing away with a substance for this reason, I think that vulcanite cannot be overestimated.

There is no doubt that by the use of this material we are able to obtain results that were impossible in the days of bone and plate work only, when, for instance, in an edentulous case, springs were indispensable in 90 per cent. of such cases. Now see what wonderful suction cases can be made, so that again, in almost entirely superseding these uncomfortable and expensive things (springs) to a very great extent, vulcanite has well earned the high position it now holds in the Dental profession.

But like most things there is a fault to be found somewhere. In vulcanite, the great drawback is that by its easy means of manipulation it has lowered the mechanical portion of our profession to the great extent it has, and by that means been almost a curse to the profession.

What skill or knowledge of mechanics is necessary in making pieces of this material? I mean in making them after the fashion we are in the habit of seeing in pieces brought to us for repairs, etc., when in a very great many cases you would almost think that instead of it having been made by a dentist, it had been the production of the proverbial "barber," or perhaps even his boot maker.

Some four or five years ago who could not be a dentist? Look at the hundreds of men-assistants to every conceivable trade or profession under the sun who were evidently impressed with the fact that dentistry was nothing to learn, and was extremely remunerative; men, in fact, taking up the profession who certainly had no more mechanical ingenuity than you would expect to find in a ten cent rubber doll, and about as much fit to belong to the Dental profession as they were to be Prime Ministers. What was the greatest stimulant to this flow of talent into our ranks? I do not want to be unduly confident in my opinion, but I feel as certain that it was owing to the introduction of vulcanite into the profession as I am that I am standing here.

I do not say that if this material had not been used for dentistry that we should not have any of those advertising quacks in the profession, whose work is so characteristic of the men themselves, as the existence of such men in all businesses or professions is inevitable, but I do say that their number would have been wonderfully decreased if we had only had something introduced to supersede bone that required a tolerable amount of skill in manipulation with the advantages that you get with vulcanite. If a material of this description had but been invented, I do not think that the passing of the Dentists' Act of 1878 would have been so absolutely necessary as it was, as nine-tenths of the advertising dentists of the present day would not (if it were not for that ill-used material, vulcanite) be able to earn sufficient by their mechanical skill to keep themselves in salt.

I am afraid that when most of us students begin to get anything like proficient in the operating department of our profession, we most lamentably neglect the mechanical. From personal experience, I know it has been the case with me, and I am sure it has been so with many others.

Speaking candidly, I do not think it is much to be wondered at, considering the disparity between the one and the other. I am sure we all of us like to cultivate a professional appearance as much as possible, which is perhaps a somewhat difficult thing if we have much to do with the workroom, but still under no circumstances should it be entirely avoided.

For my own part, I have been getting rid of my dislike to the bench, as some of its advantages are beginning to dawn upon me. It is all very well to learn how to stop teeth, but do not forget how to make them. This latter part is where eighty per cent. of our income will come from. There are some exceptions, but I do not think many, as the little experience I have had leads me to believe that it will be more easy to persuade a patient to have a tooth removed than a gold filling hammered in. This is perhaps owing to the patient or a friend having fallen into the hands of a man in the habit of putting in fillings on exposed nerves and suppurating pulps. Such practice as this by a few unprincipled men means severe injury to the stopping portion of our profession all over the country, and, until these men die out, there will be a great majority of our work "mechanical."

Even the suggestion of stopping a tooth that a patient has come to you with the intention of having extracted is almost sufficient to cause some patients to leave the operating room, and say, if you will not take it out she will go somewhere where they will, as she knows what stopping teeth means, having, perhaps, been operated upon at some time or other by one of those men just referred to. You cannot get every one to believe in saving teeth, and as soon as they ache they are under the impression they should be removed, whether right or not.

Although, as I have said, my experience in private practice has been extremely limited, I firmly believe that we shall have no difficulty in persuading a hundred per cent. more patients to believe in artificial teeth than we shall in stopping. Of course, this prejudice to filling teeth will gradually disappear, and then mechanical work will be less.

But still, even anticipating this, I think it is of the greatest importance that we should not let this dislike for the bench grow upon us, as it is very certain that we shall not be able to get assistants to work as we should wish unless we are sufficiently good workmen ourselves to show them what is really necessary to be done, and by that means endeavour to improve the mechanical dentistry of the future, and get it into something like its old artistic form. The deterioration has certainly reached its minimum, and everything in the future tends to make it what it should be, and with the continued assistance of such institutions as the National Dental Hospital and College, and the help of such gentlemen as we have here teaching us to become masters of the bench, we shall very soon see that grand reformation in Dental Mechanics which is so thoroughly essential in upholding the honour of our profession.

A FEW CASES OF BROKEN JAW.

By Charles E. Truman, M.A., M.R.C.S., L.D.S.Eng., Assistant Dental Surgeon to St. Thomas's Hospital and to the Dental Hospital of London.

(From "St. Thomas's Hospital Reports," Vol. XIII.)

In most books where the subject of broken jaws is treated no mention is made of injury to the teeth. I think that under this head it is quite legitimate to speak of broken and dislodged teeth.

The fracture of one or more of the *front* teeth is a common accident, and it is important to know what to do in each case. If a small piece only of the tooth is broken off it can be smoothed and rounded, so that food will not lodge, thus lessening the liability to decay, and also making the injury less conspicuous. The piece broken off can be reproduced in gold or cement stopping, or a piece of porcelain can be fixed on with gold or any other stopping. If a large portion of the crown is broken off, the question to be decided is, whether it is better for the patient to have the remaining portion of the tooth extracted, so that the adjoining teeth may come together, or whether the fang should be left, that a porcelain crown may be attached to it.

The three things to be considered are the age, sex, and station of the patient.

If the patient is under fifteen years of age, the fang will not be sufficiently developed to hold a pivot, and if the accident has happened to the mouth of a girl it is more important to consider appearances, as a boy can cultivate a moustache, which will hide the loss of a tooth. Poor people, as a rule, would rather have the tooth out than incur the trouble and expense of a pivot. When the crown is much broken, the pulp is nearly always exposed, giving great pain. If the tooth is not to be extracted the pulp must be destroyed. It has been proposed to do this by sharply driving a piece of soft pointed wood up the canal, but this does not seem to me a good plan. Nitric acid acts very well; the stronger the better. If nitric acid is applied to the pulp on a piece of wood or on a fine metal bristle the part touched is killed at once, and the whole pulp will be destroyed without pain after two or three applications. Care, however, must be taken that no nitric acid shall get upon the gums. This is prevented by protecting the mouth with a napkin wrapped round the broken and adjoining teeth.

The front teeth are often knocked out of the jaw at football, cricket, &c. Each tooth should be cleansed at once by washing it, if possible, in warm water. When the bleeding of the socket has stopped the socket also should be washed out to free it from dirt and clotted blood, and the tooth pressed into its place. In most cases the tooth will hold in perfectly well without any support, but if it is found to be necessary, a small vulcanite or gutta-percha plate can be made, capping the teeth on either side, as well as the loose one, or a small strip of rubber dam with holes made in it at each end can be used. The teeth on either side are put through these holes, and a piece of well-waxed silk is tied round the necks of the teeth, the intervening portion of rubber being stretched over the injured tooth. Or again, a small splint may be made by using one of the cement stoppings, and plastering this over the teeth when about the consistency of cream, keeping it dry until it has set, and then trimming it up.

In all cases of broken jaw, care must be taken that a tooth has not slipped in between the ends of the broken bone, which would delay or prevent union. Displaced teeth should be put back into position, even if they have been quite knocked out of their sockets, as in most cases they unite firmly and do well.

CASE 1.—R. A. H——, æt. 20, came on the 4th of January, 1882, complaining of great pain over the left side of his face and jaws. Ten days previously he had gone to a chemist to have the first left upper molar extracted. The key was the instrument used for this purpose. The operator, finding that more than the first molar was moving, desisted, and plugged the tooth with amalgam. On examining the patient's mouth, I found the portion of the alveolus containing the first and second molars and wisdom tooth on the left side of the upper jaw displaced downwards and outwards, and these, coming in contact with the molars of the lower jaw, made it impossible for the man to close his mouth. As the first molar was very loose, and the pain seemed to be caused by the metal stopping pressing on its exposed pulp, the tooth was carefully extracted. The pain was now relieved, but the displacement of the second molar and wisdom tooth still prevented the closing of the mouth. As these could not be pressed into place, I took an impression of the mouth, rectified the plaster model, and made a vulcanite splint fitting this model in the usual way. This would not go into its place, but as I knew that the splint was correct, it was tied in with silk, so that, by the lower teeth biting on the vulcanite, the splint would be gradually pushed up into place, and the portion of alveolus and teeth would be thus forced into their right position.

The next time I saw the patient, after an interval of a week, the splint was in place; he could eat quite well with it, was free from pain, and his general health was much improved. His health had suffered from the fact that he had not been able to eat for ten days.

At the end of the third week the splint was taken off; I found the alveolus united, and the teeth in their normal position, but as they were still loose he wore the splint for one more week, at the end of which time he went away cured.

Case 2.—This was the case of a boy, æt. 10, who had been knocked down by a runaway horse a fortnight before I first saw him. His head was injured at the same time; this was attended to at the hospital in the country.

On examination I found the alveolus containing the four upper incisors driven inwards. The gums round the necks of the teeth had been injured, making the teeth now look too long. The alveolus and teeth were fixed in their abnormal position, and could not be pushed into place. I took an impression of the mouth, and made a vulcanite splint to fit this model just as it was, with the teeth and alveolus in the wrong position. The front part of this splint was pierced with holes, and these holes were countersunk on the lingual surface. The inside was now lined with a thin layer of gutta-percha, which was forced through the holes, thus holding it to the vulcanite. By this means the front part of the splint was made more prominent, so that when it was put into the mouth the gutta-percha pad pressed upon the displaced portion of the jaw. This was tied in with silk, and as the boy bit on the back part of the vulcanite which capped the upper molars, he gradually pushed out the alveolus containing the incisors. By increasing the thickness of the gutta-percha pad from time to time, the broken portion of the jaw was gradually forced into place.

CASE 3.—Rev. J. H. C——, æt. 32, and six feet two inches in height. When he was fourteen years old he fell down, cutting his face. He was taken to the village chemist, who strapped up his face, but did nothing more. There can be no doubt, from the state of his lower jaw now, that it was broken by the fall. At the present time, the teeth meet *only* at the back of the mouth; the wisdom teeth entirely, and the posterior halves of the second molars on either side. On the left side of the lower jaw there is a deep dip, the apex of which corresponds to the second bicuspid; the interval at this spot between the grinding surfaces of the upper and lower teeth is $\frac{9}{16}$ths of an inch. At the front of the mouth the interval between the cutting edges of the upper and lower central incisors is $\frac{3}{8}$ths of an inch. The consequence of this inability to close the mouth is that he cannot masticate his food, and is therefore a martyr to indigestion. At the bottom of the dip the crown of the second bicuspid can just be seen above the gum. The falling of this tooth down between the broken ends of the bone was most likely the cause of the great deformity. The patient says he was fourteen years old when the accident happened, and as the second bicuspid is cut at about the eleventh year, we may conclude that it was then erupted. He has suffered very much from neuralgia, and I think this may fairly be ascribed to the second bicuspid, whose fang must be pressing on the inferior dental nerve. He will not have this tooth extracted, nor will he have anything done to improve his power of mastication.

CASE 4.—William Francis H——, æt. 38, a coal porter at the Vauxhall Gasworks, was admitted into Albert Ward under Mr. Sydney Jones, on Thursday, March 27th, 1884. He said that, whilst wheeling a barrow, he fell on to his face on a concrete floor from a height of twenty-five feet. I saw him the next day, Friday, March 28th. The whole of his face was very much swollen and bruised, and the lower lip was cut at the centre. It was therefore difficult to make out what injuries the jaws had received. The lower jaw was broken between the two central incisors, and a V-shaped piece of bone containing the left central and lateral incisors was wanting. The upper jaw was fractured vertically between the two central incisors, and also horizontally, but all the bones of the face were more or less broken, as on pressing upon the upper centrals movement could be seen at the lower rim of the orbit, and at the seat of junction of the nasal bones with the frontal. The hard palate was perforated a little to the right of the median line.

I took an impression of the mouth, but found great difficulty, as the swelling of the face and lips made the aperture of the mouth so small, and also on account of the great mobility of the bones of the face. An ordinary modelling tray could not be got into his mouth. I therefore divided a tray down the middle of the handle, and took an impression of each side of the mouth separately. The grinding surfaces of the back molars of the upper and lower jaws could not be separated however widely the patient opened his mouth, so the sister kindly held the portion of the jaw opposed to the one I was modelling out of the way with a tongue spatula, and I also used the surface of this spatula as a guide to slip the back of my tray along. After several attempts, I managed to get an impression of each jaw in two halves.

To the models obtained from these impressions when cast in plaster and rectified, a separate vulcanite splint for each jaw was made, with the upper surface of the lower one and the lower surface of the upper one flat where the two splints would come in contact. These splints were put into the patient's mouth on the following Monday, and at first had nothing to hold them in position. After two or three days, a four-tailed bandage was put on. At the end of a week I tied both splints in with silk, by passing the silk round a tooth on each side of the jaw, tying this, and then threading the ends through holes drilled in the vulcanite.

By the 22nd of April (*i.e.*, at the end of the third week from the time the splints were first put on) the upper jaw was united, but the central incisor of the right side was a little longer than the other one. This I made right by rounding off its corner. The upper splint was not put on again. The lower jaw was still ununited on account of the piece of lost bone. My own splint was put on, without any arms or anything but the accurate fit of the gutta-percha to fix it. It held the portions of the jaw together quite firmly, and he said he could eat well with it. A fortnight after it was put on I had to cut off some of the gutta-percha, as it made his mouth sore. Later on I told the patient to take the splint in and out himself, and to use it at meals, as he said he could not eat without it, and in this way by degrees he has left it off altogether.

The two splints that are the most universally adapted to all cases of fractured lower jaw are Hammond's and Kingsley's.

Hammond's is the continuous strong iron wire passing from the labial sides of the teeth backwards around the last molars, and thence to the lingual surfaces, this being held firmly in place by much thinner wire passing round the splint, and round each individual tooth. This splint is very difficult to apply, and unless all the details are strictly attended to it is not effectual.

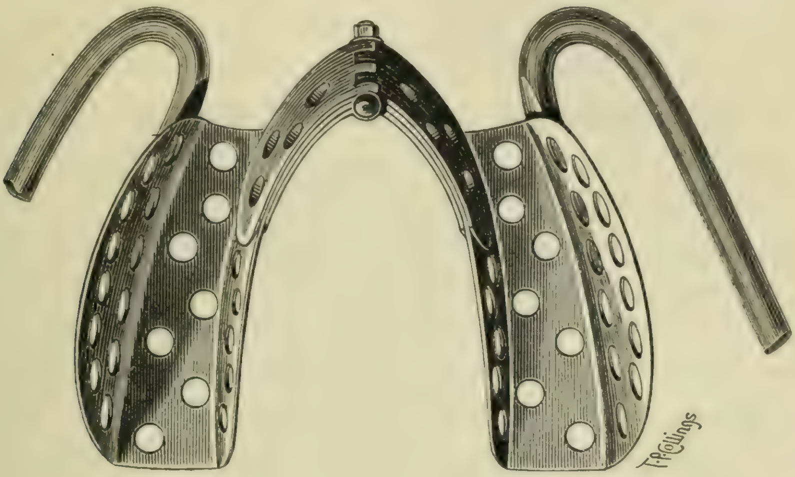
Kingsley's, which is really a modification of Hayward's, is a vulcanite splint fitting the teeth, and held in place by two arms attached to the vulcanite, and passing out of the mouth at the angles of the lips. These arms are held firm by a bandage passing round them and under the chin.

Both these methods involve the making of an entirely new splint for each case. My endeavour has been to make a splint that can be applied at once to any case.

A semicircular trough is made of sheet metal (I prefer steel), so as loosely to fit a medium-sized jaw. The front of this trough is cut away until the lingual surface only is left. At the centre of the lingual surface there is a hinge, so that the splint may be opened and shut to make it fit a jaw of any size. The pin of this hinge will take in and out, and will also fix the hinge in various positions. The body of the splint is pierced all over with holes, and has attached to it arms which can be taken off. If the pin of the hinge is taken out the splint will be in two pieces, and can be put together again so that either side is at a higher level than the other.

To use the splint make it resemble as much as possible the shape and size of the broken jaw to be treated; line the inside of the metal with softened gutta-percha; put this into the mouth with the gutta-percha on the tops of the teeth; press the trough down until the teeth and gums are embedded in the gutta-percha.

Then take the whole thing carefully out of the mouth, and place it in cold water to harden. As soon as it is hard, take the gutta-percha out of the metal. Now you can see the impressions of the teeth, and their irregularities caused by the fracture of the jaw. All these irregularities must be removed by cutting the gutta-percha through at the lines of fracture, and reuniting the pieces thus produced, so as to make the impression in the gutta-percha what it would have been had it been pressed upon the jaw before the jaw was broken. Now make the metal splint as nearly as possible the shape the jaw should be, and insert the gutta-percha representing the impression of the normal jaw inside it again; cover the whole of the outside of the metal with a sheet of gutta-percha. When cold, trim it up with a hot knife, and polish it with soap. Cut holes in the gutta-percha at the seat of each fracture, so that the tops of the teeth can be seen, in order to be sure that the portions of the jaw are in their right position.



This splint can also be used by pressing the gutta-percha when soft upon a plaster-of-Paris model which has been made like the jaw was before it was fractured, instead of pressing it upon the jaw itself.

The arms are to hold the splint in place for the first few days, but it will be found that they are not as a rule necessary; the gutta-percha lining of the splint fits the teeth and jaws so accurately, and also shrinks a little on hardening, so that the portions of the jaw are held quite firmly without the use of the arms.

The top of the metal covered with the gutta-percha is quite hard enough for the patient to masticate his food. The splint can be taken out from time to time, thoroughly cleansed and replaced, and, if it is thought good, the gutta-percha can be stripped off and new substituted. The metal portion of the splint of course can be used over and over again.

GENERAL GRANT'S CONDITION.

By Frank Abbott, M.D.

There having appeared in the medical journals and the daily papers so many statements in reference to the case of General Grant, the condition of his teeth, the cause of their removal, &c., &c., I am induced to give to the profession and the public, through these columns, the facts, so far as they have come under my observation and treatment. On the 8th of November, 1884, General Grant consulted me, by advice of his physician, Dr. Fordyce Barker, in reference to the advisability of having the right upper first molar extracted, stating that he had for a week or ten days been suffering from great pain on that side of his head and face, and that his physician had advised the removal of this tooth, as it was, in his opinion, the cause of the trouble. Upon examination I found the tooth dead, with an abscess at the apex of the anterior buccal root. It was considerably projected from its original position, and the neck and perhaps one-half the length of the roots were covered with tartar. I at once coincided with Dr. Barker that this was probably the cause, in a measure at least, of the neuralgia, and advised its immediate removal, and this was accordingly done. The relief from severe localized pain was prompt and highly satisfactory to the General, as well as to myself. I made no further examination of his teeth at that time, as he expressed a desire to make appointments with me in a few days, for doing what should be found necessary for the health and comfort of his mouth, and for the reason that he wished time to recuperate from the distressing pain and sleeplessness from which he had so long been suffering. On the 14th of the same month I again saw him, and carefully examined his remaining teeth. The first to particularly attract my attention were the second and third right superior molars, posterior to the opening from which I had removed the first molar. Both of these teeth were projected from a quarter to three-eighths of an inch, being drawn from their original positions; the necks and at least two-thirds of the length of their roots were thickly coated with a dark brown or black tartar, the sockets in consequence being almost entirely absorbed, while the teeth were so loose that they might easily have been removed with the ancient "lead forceps." In addition to this the second molar was very badly decayed, the side wall broken down, and the pulp dead. The surrounding gum was greatly irritated, the inflammation extending to the roof of the mouth, and back into the fauces. Finding these teeth in so deplorable a condition, and there being no antagonizing teeth, I advised their immediate removal, believing, as I did then, and do now, that they had more or less agency in at least aggravating the lesion which then (and had for five months) existed in his throat and upon his tongue. He consented, and I at once removed the teeth. I then removed some of the tartar from other teeth in his mouth, and dismissed him. I again saw him on the 17th of the same month, at which time I thoroughly cleansed his teeth and put in some fillings, all that was necessary to do upon the teeth remaining in his mouth. How long these teeth had been in the general condition in which I found them I am unable to say, but probably (and I judge from all the conditions described) it had been many years. If we take into consideration the highly irritable condition of that region of his mouth, the extension of the inflammation into the vault and down that side of his throat, the rough and ragged surfaces of a broken tooth, and the tartar incrustations, against which the side of his tongue was almost constantly rubbing, I believe that I am quite justified in concluding that here may have been a factor, at least, in the localization of the painful disease from which the General is now suffering, instead of attributing it altogether to the habit of smoking, which seems to be the prevailing opinion, at least among the laity.

The motive that prompts me to write this article is a desire that the case may stand as a solemn warning to all those *advancing in years* against the tolerance of any rough surfaces (such as are here described) in the mouth, by which the tongue or other tissues may be kept in a state of constant irritation, and that an instructive instance may be laid before my brother dentists.—March 20, 1885.
—*Independent Practitioner.*

THE ODONTO-CHIRURGICAL SOCIETY.

The Annual Meeting of the Odonto-Chirurgical Society was held at 30, Chambers Street, Edinburgh, on the 13th of March, Mr. Andrew Wilson, L.D.S.Ed., President, in the chair.

The accounts showed an amount of £34 4s. 6d. income from subscription of members, which, with a deposit receipt, the interest thereupon, and the balance in hand from the previous year, made a total of £142 2s. 4d. The expenses incurred for rent of rooms, printing, stationery, and incidental matters amounted to £38 9s. 10d., leaving a balance of £103 12s. 6d. in the hands ot the Treasurer, including a deposit receipt for £95.

The following gentlemen were elected as Office-bearers for the ensuing year:—President, Mr. W. Bowman Macleod, L.D.S.Ed.; Vice-Presidents:—Dr. W. H. Williamson (Aberdeen), and Mr. John A. Biggs (Glasgow); Treasurer, Mr. Malcolm Macgregor, L.D.S.Ed.; Secretary, Mr. John S. Amoore, L.D.S.Eng.; Curator and Librarian, Mr. George W. Watson, L.D.S.Ed.; Councillors, Mr. Andrew Wilson, L.D.S.Ed., Mr. J. Moore Lipscomb, L.D.S.Eng., Mr. James Mackintosh, and Mr. E. A. Cormack, L.R.C.P. and S. and L.D.S.Ed.

The President having vacated the chair, read the following paper upon

THE MISSING INCISORS IN MAN—WHICH ARE THEY?

The number of incisor teeth in what is called the typical dentition in placental mammalia being in each jaw six, or three pair (one central and two lateral), while that in man is normally two pair (one central and one lateral), the question I propose raising is, which of the lateral pairs has been suppressed? The answer given by the authorities on Dental Anatomy is, the outermost, *i.e.*, the third on each side. Mr. C. S. Tomes, in his manual, second edition, page 9, says:—"The human subject does not possess the third incisor . . . . so that a somewhat abrupt change of form in passing from the incisors to the canines . . . . is no more than might be anticipated." And at page 286 he gives as a general rule, "It is usually said that when incisors are missing from the full typical number, they are lost from the outer end of the series, that is to say, if there is but one incisor, it is I^1; if two, I^1 and I^2. There are many exceptions to this, *e.g.*, the first incisor is the first to disappear in the otter (?), walrus, and some others."

The first-named is evidently a misprint for the Otariæ (eared seals), the number of incisors present being very varied in the different genera among the Phocidæ.

As in the superior maxilla we have the advantage of the incisor teeth being restricted to a well-defined portion, the intermaxillary, originally a distinct bone, I will, in what follows, speak of the upper incisors only.

Cases in which we find the full typical number of incisors present and of normal form in man are seemingly very rare, but cases in which, while only the normal number was present on one side, there were three on the other, are much more frequent.

These extra teeth usually follow the lateral type, but we have a model in the museum of our Society of one following the central type.

Of the first class I have only met with two (exclusive of one* in the temporary dentition), as against seven of the second class, and as in these (with two doubtful exceptions) the lateral second from the canine seemed to me the intercalated one, I have been in the habit of teaching that I considered the suppressed incisor in man to be the second, not the third, the authority of the manual notwithstanding.

This view is very materially strengthened if we include as incisors those abnormally formed teeth which so frequently show themselves in the intermaxillary portion of maxillary bones.

These almost invariably take up a position either between the normal lateral and the central incisor, or the mesial line, most frequently within the dental arch.

Looking to the forms of these teeth, we may arrange them in two groups, the first—by far the more common—are pointed conical teeth (the typical supernumerary tooth); the second are usually much larger, with very irregularly formed cutting edges, frequently broad and multi-tuberculated.

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* In this the teeth formed a perfect arch, and the central and second incisors were geminated, each having its own pulp cavity. The after history of this case would have been of considerable value, but the accidental death of the boy made it only partial. A second model shows that the second incisor on the right side was succeeded by a permanent one, which erupted *outside* the arch. His father (a medical lecturer) reported that a lateral had appeared on the other side in succession to the *third* temporary incisor, and that there was no appearance of a second. Still, sufficient time had not elapsed to say it might not have come; at the same time, if it had done so, it would have been out of the arch.

The first group I hold to be lateral incisors taking on the rudimentary form, which we find, as a rule, to precede suppression, and which we now find not unfrequently in undoubted lateral incisors.

I may remark in passing that it is from the more frequent appearance of this form in the normal lateral, coupled with the seemingly now more frequent suppression of this tooth, that we conclude that in man there will in course of time be only the central incisors left.

Those of the second group I regard as, when large, malformed incisors of the central type, and when smaller, of the lateral; and I think a close inspection of these forms will bear me out.

Holding these opinions, I was much pleased to learn, through a paper by Professor Turner on "The Relation of the Alveolar Form of Cleft Palate to the Incisor Teeth and the Intermaxillary Bones," read before the Royal Society here in December last, that Dr. Paul Albrecht had, while investigating the anatomy of cleft palate, been led to the same decision regarding the suppressed incisors in man.

For the benefit of those members who may not have an opportunity of seeing that paper, which strongly supports Dr. Albrecht's views, I will, in conclusion, very briefly give the chief points which led Dr. Albrecht and Professor Turner to that decision.

In very much the larger number of cleft palate cases examined by them they found that the alveolar fissure, in place of being in the line of the maxillo-intermaxillary suture, that is, between the outer incisor and the canine, was to the *mesial* side of the outer incisor and so in the body of the intermaxillary bone, the maxillo-intermaxillary suture coexisting with it. Minute examinations of a large series of superior maxillæ led to the detection of traces more or less decided of an "intra-incisive" suture (in the plane of which the cleft usually occurs), and to the conclusion that originally the intermaxillary portion consisted of two bones on each side, the mesial one of which, in man, carried the socket of the central incisor, the other that of the lateral.

In those cases of cleft palate in which an extra incisor was present, its socket was *invariably in the mesial portion* along with that of the central, showing it to be the second incisor of the typical dentition.

The President, on resuming the chair, called upon Mr. Macleod to read the paper he had received from Mr. Oakley Coles upon "Congenital Alveolar Fissure," which was rendered additionally interesting by the exhibition of a large number of models that Mr. Coles had forwarded in order the better to illustrate the cases referred to in his paper.

In introducing Mr. Oakley Coles' paper, Mr. Macleod said that at the beginning of the session he had intended to bring this subject before the Society at the February meeting, and had collected matter for this purpose, when he was waited upon by Professor Turner, who was engaged in the same investigation and was preparing a paper for the Royal Society of Edinburgh. He made over the cases in his possession to Professor Turner, and supplemented these with several which, through the courtesy of Messrs. Hutchison and Willoughby Weiss, he had obtained from the collection of the Odontological Museum in Leicester Square, London. The cases enumerated in Mr. Coles' paper could not be got ready in time for Professor Turner's paper, and might therefore be looked upon as supplementary to that very valuable contribution to oral anatomy, which was published in the *Journal of Anatomy and Physiology*, vol. xix.

Mr. Macleod then read a few extracts from Professor Turner's paper, which it is unnecessary to quote, being published in the *Journal of Anatomy and Physiology*, and in *Proceedings of the Royal Society of Edinburgh*, also reprinted in the *Journal of the British Dental Association*, the first portion appearing in the number for March 15th.

CONGENITAL ALVEOLAR FISSURE, WITH ITS ACCOMPANYING DENTAL CONDITION.

By Oakley Coles, L.D.S.Eng.

It is proposed in the present paper to deal with the consideration of 31 cases of congenital fissure of the alveoli and hard palate, occurring in my own practice.

The numbers given will correspond with numbers attached to the models.

Following the example of Dr. Albrecht and Professor Turner, I shall speak of the tooth placed anteriorly to the true canine on the side where the fissure occurs as the pre-canine tooth, though I do not by this wish to admit the acceptance of the theory that man has ever had, normally, six true incisor teeth. For simplification of comparison I shall follow the order taken in the valuable paper by Professor Turner, and describe first, left alveolar fissure; secondly, right alveolar fissure; and thirdly, double alveolar fissure. I shall endeavour, as far as possible, to avoid coming to any definite conclusions. The views put forward are so interesting and yet so greatly at variance with much that has hitherto been held as a satisfactory explanation of the origin of fissure in the alveolar region, that it seems to me desirable we should for the present content ourselves with the accumulation of facts, rather than attempt to settle the question at issue by any premature generalization.

In speaking of right and left I shall always refer to that of the patient and not of the onlooker.

FIRST SERIES—LEFT-SIDED FISSURED ALVEOLI.

Model 11. Case 1.—Left-sided alveolar fissure, permanent central incisors, and first permanent molars erupted. Four temporary pre-molars, and two temporary canines in normal position, no evidence of temporary or permanent lateral on right side, small pre-canine in process of eruption in the left maxillary bone.

Model 22. Case 2.—First permanent molars, right permanent central and lateral incisors erupted, four temporary molars and two canines persistent, pre-canine partially erupted on left side.

Model 16. Case 3.—Dentition transitional, well erupted pre-canine on left side.

Model 21. Case 4.—Permanent molars and bicuspids erupted, right central and lateral incisor and canine in position, left apparently temporary, canine persistent, well developed pre-canine, no evidence of left central incisor.

Model 27. Case 5.—Dentition transitional, first right and left bicuspids in process of eruption, right and left canine in process of eruption, right and left central well developed, right lateral rudimentary in form, no evidence of pre-canine on left side.

Model 18. Case 6.—Adult dentition, two bicuspids and canine on left side normal in form and position, well marked pre-canine on left side. The dentition on the right side apparently irregular in character.

Model 26. Case 7.—Adult normal dentition, well marked pre-canine on left side.

Model 19. Case 8.—Adult normal dentition, crown of pre-canine on left side apparently excised.

Model 13. Case 9.—Adult dentition, no pre-canine on left side, and no left central incisor.

Model 23. Case 10.—Adult dentition, no pre-canine on left side and no left central incisor.

Model 17. Case 11.—Adult dentition, no canine or pre-canine on left side, and no left central incisor.

Model 14. Case 12.—Immature dentition, no right canine, indications of left canine and pre-canine, in process of eruption.

Model 28. Case 13.—Adult dentition, no pre-canine on left side, and no left central incisor.

Model 29. Case 14.—Adult dentition, imperfectly formed teeth, no pre-canine on left side, and no left central incisor.

Model 15. Case 15.—Immature dentition, no pre-canine, permanent canine apparently in process of eruption.

Model 24. Case 16.—Adult dentition, indications of two teeth on the left side in the canine region.

Model 20. Case 17.—Adult dentition, canine on left side, no indication of pre-canine.

SECOND SERIES—RIGHT-SIDED FISSURED ALVEOLI.

Model 1. Case 18.—Adult dentition, canine on right side, pre-canine erupted in the palate, but at the margin of the cleft no right central incisor, and one bicuspid missing on each side.

Model 8. Case 19.—Adult dentition, canine on right side, pre-canine erupted in the palate, but at the margin of the cleft, right central incisor in normal position.

Model 9. Case 20.—Adult dentition, canine on right side, pre-canine erupted in the palate at the margin of the cleft, right central present but semi-rotated.

Model 6. Case 21.—Adult dentition, canine on right side, no pre-canine, no right central incisor, left lateral incisor rudimentary in character.

Model 10. Case 22.—Adult dentition, canine on right side, pre-canine uncertain, right central present.

Model 2. Case 23.—Adult dentition, canine on right side, no pre-canine, no right central.

Model 3. Case 24.—Adult dentition, canine on right side, pre-canine excised, erupted in the palate at the margin of the cleft, no right central incisor, two bicuspids missing.

Model 7. Case 25.—Adult dentition, canine on right side, pre-canine possibly in the gum, right central incisor present.

Model 4. Case 26.—Adult dentition, neither canine nor pre-canine erupted, no right central, left central excised.

Model 5. Case 27.—Adult dentition, canine on right side, no pre-canine, no right central, left lateral apparently extracted from outside of dental arch.

Third Series.—Double Alveolar Fissure.

Model 30. Case 28.—Adult dentition, canine on each side in normal position, pre-canine on right side normally placed in dental arch, pre-canine on left side erupting outside of dental arch.

Model 23. Case 29.—Adult dentition, canine on each side, pre-canine on left side in dental arch but not fully erupted, pre-canine on right side imperfectly erupted outside dental arch.

Model 32. Case 30.—Adult dentition, canine on each side, pre-canine on left side fully erupted in dental arch, condition of right side uncertain.

Model 31. Case 31.—Adult dentition, canine on each side, no pre-canine.

Observations.

1. It will be observed that there is not a single instance of fissure of the alveoli occurring between a true lateral incisor and canine on either side of the mouth.

2. That in five out of ten cases of right-sided fissure the right central incisor is missing.

3. That in eight out of seventeen cases of left-sided fissure the left central incisor is missing.

4. That in five out of seventeen cases of left-sided fissure a pre-canine tooth is clearly present.

5. That in four out of ten cases of right-sided fissure the pre-canine is clearly present.

6. That in two out of four cases of double alevolar fissure a pre-canine is present on each side, and in a third case, on the left side.

7. That there is not any sufficient evidence in any case of increase in the number of teeth in the pre-canine region, whilst there

is distinct evidence in some cases of the reverse condition, and also of imperfect development.

8. The evidence at present before us is quite insufficient for the purpose of arriving at any conclusion, whilst the seven models without any numbers attached will indicate the singular liability of the pre-canine region of the upper jaw to irregularity, of a purely dental origin.

9. The chief aims of observers for some time to come must be the examination of fissured alveoli very early in life, the careful dissection of the premaxillary bone in cases where it has been excised for the better treatment of hare-lip during infancy, and the collection of very accurate and carefully preserved models for the purpose of recording the exact condition of the teeth at various ages.

The author of the paper apologises for the rough condition of the models submitted, but as in the original they have all been in use for the fitting of some form of artificial palate, their state will not be a great matter of surprise to those who examine the casts. They may at least be recognised as possessing the merit of being untouched so far as restoration is concerned.

The meeting then adjourned to the next room, where Mr. Watson exhibited the models illustrative of these two papers by means of an oxy-hydrogen lime-light lantern, kindly lent by Dr. Walker (London), by means of which a representation could be thrown direct from the model upon the screen. The exhibition was a successful one, and the Secretary was desired by the Society to communicate their best thanks to Dr. Walker for his kindness in lending his lantern.

The members then returned to the meeting, and the President announced that the discussion upon the papers they had heard read would then take place.

Dr. Smith said he was sure the Society felt much indebted to the contributors of the very interesting papers just read. Some of the questions discussed in reference to the intermaxillary bone had been agitated for ages, and came in very appropriately along with Mr. Wilson's communication on the missing incisors in man—as the determination of which incisor was suppressed had in some ways an interesting connection with the situation of alveolo-palatal fissure. Philosophic anatomy had generally accepted the theory that in accordance with the law of unity in animal organization, intermaxillary bones existed during one period of facial development in man ; the indication of the remains of a line of union on each side of the incisive canal in the palate being supposed to mark the limits of the intermaxillary bone. During the development of the embryo it will be recollected that in the progressive changes undergone by both the dorsal and visceral lamina of the primitive groove, that portion of the visceral lamina forming the face and neck becomes cleft across, so that what are termed the visceral arches are formed. From the upper edge of the one partly giving rise to the nasal and orbital structures there projects downwards a process called the Fronto nasal process, and which hangs down between the two projections on either side, which are the rudiments of the upper jaw. The outer edges of the Fronto nasal process on each side subsequently coalesce with the superior maxillary processes, and on ossification taking place the interposed intermaxillary bone is the result. But in cleft palate it is supposed that this coalescence, from various alleged causes, does not take place, and that the bones remain in their embryonic separate condition. There is, therefore, one point to be kept in mind here in reference to absence of the lateral incisor from the intermaxillary bone, or its representative, in cases of cleft palate being considered an indication that the fissure is situated between the central and lateral incisor, inasmuch as the interference with the coalescence of parts may have led to arrest of this incisor's development. On the other hand, it is just possible in this very early and rudimentary condition of parts, that what is termed the external nasal process might by any unusual projection downwards become so interposed between the Fronto nasal and maxillary processes as to become in this position a seat of dental development between the true intermaxillary and maxillary bones, forming, in fact, the mesognathion of Albrecht. Dr. Smith had about twenty years ago worked at this subject with the late Professor Goodsir. Altogether it was a difficult problem, and he hesitated very much in adopting any conclusion as definite in regard to the manner in which the abnormal conditions of this region were produced. He considered Mr. Wilson's observations in reference to the disappearance of certain teeth and its premonishment in the human jaw as of much interest.

A somewhat animated discussion then arose, in which several members took part, regarding the suppression of the lateral incisor, and the frequent appearance of this tooth in the jaw in a malformed and stunted condition, it being upheld by some that these facts clearly pointed towards an ultimate total suppression, it sharing these peculiarities with the wisdom tooth. One member, who spoke from long experience, had not noticed more than some three or four cases of suppression during his years of practice, and he believed that in most instances their absence was due to non-eruption and not to non-development. The consensus of opinion was, however, against this view, as most of the members had met with, comparatively speaking, frequent cases of suppression of the lateral, and had often noticed their appearance in a stunted and rudimentary condition.

In replying, the President said that he quite agreed with what Dr. Smith had said as to the inadvisability of founding any theory on cases of interrupted development, and in his paper he had only referred to Professor Turner's paper as corroborative evidence. The mere fact that such imperfect development of the maxillæ interfered so little with the normal number, form and size of the incisors was surprising, as naturally they might have expected to find dwarfing or even suppression, certainly not any increase in number. As regarding Mr. Campbell's remarks, he could only say that the fact of organs becoming rudimentary previous to disappearing was generally accepted by both physiologists and naturalists, and in its special reference to the teeth they had abundance of evidence as to its accuracy in the dental anatomy of the other mammalia. Mr. Campbell's experience as to the suppression of the upper lateral incisor was very different from his, as he found it a not uncommon occurrence. In one family alone he had found *five* cases of total suppression. As to saying that they were only non-erupted, he certainly had neither seen nor heard of impacted laterals, and he very much doubted Mr. Campbell's agreeing with him if he were to say that, founding on those cases showing the typical mammalian number, six were always present, only that in the great majority of mankind so many ot the number were non-erupted.

There then followed in an adjoining room a very interesting exhibition by Mr. Watson of microscopical preparations of Dental Histology and Pathology by means of his lime light lantern. The instrument itself was novel, and the arrangement connected with it, by means of which the necessary gases were supplied, were very simple and effective. The lantern was so constructed as to show either photo-micrographs or the object itself as mounted upon the slide in the ordinary way. With a half-inch or quarter-inch objective, the projection was all that could be desired, but with the higher powers the results were not so satisfactory.

Mr. Watson exhibited a large number of slides, commencing with sections of the fœtal jaw, showing the developing tooth germs and the dental tissues in different stages of calcification, and passing on from these to preparations of the fully formed tooth, and then to the structures of these tissues under various patholcgical conditions.

He also showed several slides illustrative of the principal types of dentine and enamel, as met with in comparative Dental anatomy, and concluded with sections of epulis and tumours taken from the jaw. As each slide was passed through the field, Mr. Watson made remarks pointing out the special points of interest and otherwise explaining the nature of the structures exhibited.

On the motion of the President, the Society thanked Mr. Watson warmly for the trouble and labour he had taken upon himself to render this exhibition a successful one, and they also desired to thank Mr. John J. Andrews (Belfast) and Mr. Amoore for the loan of some slides they had lent for the occasion; and congratulated Mr. Andrews upon his success in preparing some very fine slides illustrating the development of the tooth germs.

The members having returned to the meeting, Mr. Wilson said that before vacating the chair, he had to thank the Council for their valuable assistance in carrying on the affairs of the Society during his term of office, as also to the members generally, for their lenient judgment. While claiming no decided advance, they had, at least, held the position of the Society as a scientific body. Knowing as he did, what the energy and business qualities of his successor were, and what he had done for the profession in other fields, he had very great pleasure in moving that Mr. Bowman Macleod now take the chair.

Mr. Macleod, on taking the chair, made a few appropriate remarks, thanking the Society for the great honour they had that day conferred upon him by electing him as their President.

Cases of Interest.

Dr. Williamson exhibited a model of lower teeth, showing the mechanical effect of the use of a penknife as a toothpick. The patient, a man of about 60 years of age, had got into the habit of removing tartar from between his lower front teeth with a penknife, and had produced a series of pointed arches from canine to canine.

Also a specimen of a cavity in front tooth on labial surface, filled with Williams' platinum and gold foils, No. 3, the darkest shade, the colour produced being of a soft grey, and not so conspicuous as a pure gold filling.

Mr. Rees Price showed a model of upper jaw of patient who had come into the hands of Mr. James Cameron, of Glasgow. The woman was about 30 years of age, and had the gums much thickened, and full of decayed stumps. In the region of the right canine and lateral, Mr. Cameron had extracted 10 little supernumerary teeth, some of which were very perfect in appearance.

It was announced that the next meeting would take place early in November, probably upon the 12th.

THE ODONTOLOGICAL SOCIETY.

The sixth ordinary monthly meeting of this Society for the present session was held on Monday evening, April 13th, C. Spence Bate, Esq., F.R.S., President, in the chair.

Mr. N. Pedley made some observations upon the advantages of section through the lower jaw being made oblique, thereby facilitating the adaptation of a splint and the healing process.

Mr. Henri Weiss showed a tooth which had been the seat of absorption, the characteristic excavations being present.

Mr. Bland Sutton, F.R.C.S., made a communication on

Diseases and Injuries of the Jaws in Wild Animals.

Mr. Sutton remarked that he had found that there were a great number of cases on record in the *Transactions* of Societies bearing upon the subject before them, but as far as he could ascertain there had not, up to the present, been any attempt to systemise in any way the different kinds.

In the paper which he had written, and which would be published in the *Transactions* of the Society, they would find the different classes of diseases described; but it was not his intention that evening to read that paper, but simply to limit his observations to the cases which had come under his own notice.

In the first place he would refer to Malformation of the Jaws.

The first case he wished to draw their attention to was that of the skull of a duckling, which he would pass round. They would observe that the upper mandible failed to be developed. It was astonishing how the absence of the upper bill of a bird gave it the appearance of a human face.

In that kind of case it very frequently happened that the deficiency of development was not confined to the face, but affected the other parts. It would be seen from the specimen before them that the cranial vaults were defective. Fish were more liable to suffer from diseases in the upper jaw. In Germany, many carp were called pug-nosed carp, this class of fish in reality being those with malformations of their upper jaws.

Fracture of the lower jaws was another class he wished specially to call their attention to, and the skull of the rabbit before them was a very good illustration. The animal had sustained a fracture which had not united, so that the jaws failed to meet each other. The incisors in the upper had played upon the others, which had consequently given rise to a great deal of growth of bone in the lower jaw.

Overgrowth of animals' teeth owing to diseases or fracture of the teeth was a very common complaint; but the case before them was a very uncommon one, namely, the overgrowth of the teeth caused by the fracture of the jaw.

The next case of interest was one of injury in an animal known as the Prongbuck. This was a very interesting kind of animal, as it was the only one of its class which shed its horns in the same way as the deer. From all appearances the animal must have had a blow on the side of the face, which had caused an abscess or deposit in the tooth, as something like dentine was to be seen in it. He was of opinion that the substance discovered was not secondary dentine but osseous matter.

Absorption of the alveolus was a disease very commonly found in human beings, but, as far as he could ascertain, was of very rare occurrence in animals. That was very easily accounted for, from the fact that as soon as a wild animal had a disease in its teeth which kept it from eating its food, it very soon became very weak and easily fell a prey to a stronger species.

A case of the kind he wished to bring under their notice was that of a kangaroo, in which the teeth had fallen out and absorption to a considerable extent had taken place.

The next case was one of recent date, and had occurred to a Himalayan bear, which had lived in the gardens of the Zoological Society for fifteen years. Nearly all the teeth had fallen out; the only ones which had resisted the decay was the canine teeth, and one of those had a very large deposit of tartar upon it. The absorption had affected the fangs towards the alveolus, the teeth being retained in position merely by cords of fibrous tissue. The teeth in the lower jaw dangled about like a polypus, as in some specimens they met with.

Atrophy of the jaws really proceeded from two causes; first, from the premature falling of the teeth, as in the case of the kangaroo; and secondly, from a deposit of tartar upon the teeth which constituted a disease known in the human teeth as pyorrhœa alveolaris or Riggs' disease.

The next skull before them was that of a monkey, in which there was a very considerable deposit of tartar, and atrophy of the lower and upper jaws had taken place to a considerable extent. The disease was so extensive in this case that nearly the whole of the fangs of all the teeth were exposed. It had been the cause of the monkey's death, the disease having brought on septic pneumonia, from the running of the foul discharges from the mouth into the lungs. He had not brought the case before them as a very curious specimen of Riggs' disease, as it seemed to be a very common condition amongst animals. He did not think that they would be able to find a collection of pathological specimens of kangaroos' skulls but what would show with tartar upon their teeth.

He did not know whether such an extreme condition as death from Riggs' disease had been recorded in the human race, but it was, at the same time, a very strong argument that those people who wished to keep in good health should visit their dentist frequently.

There was no affection in animals which caused more diseases of the jaws than alveolar abscess. In fact, it seemed that alveolar abscesses had existed as long as teeth had.

Any one who would take the trouble to go through "British Fossil Mammalia," that very interesting work by Professor Sir Richard Owen, would be convinced about the matter.

Mr. Sutton said, he had seen so many cases of alveolar abscess in animals, that he had had ample proof that they were very prone to it; and the evidence showed, unmistakeably, that the teeth had been a source of trouble to their possessors, and the diseases affecting them were not merely due to their civilized condition. Alveolar abscesses were not, however, the only things which gave rise to pain.

He wished to show them the specimen of an odontome, which had occurred in a Nargooti. The appearance of the lower jaw was really like a tube of bone, the odontome having given rise to irritation, then suppuration, until the two plates had become hollowed out.

The odontome appeared to be entirely composed of cementum, which was a very curious fact.

Whilst speaking on the subject of odontomes, he would bring to their notice a very interesting specimen, it being a section through the skull of a goat. The animal was a cross between a common English and a Nubian breed. It was brought to him as a rickety animal for examination, but he had discovered that it was not rickety. The animal was considerably deformed on the face, and he discovered a molar tooth embedded in a thick cyst. The bone was so soft that it could be cut with a knife, and examination of a section of deposit proved to be cells of tissue in the process of being ossified.

The next subject which he wished to bring under their notice was a case occurring in a sea lion. The animal had never lived in captivity (which fact slightly contradicted the statement generally made by people that civilization was the cause of disease). The condition of the animal was one of hyperostosis. The enormous overgrowth of bone was largely around the alveoli. The teeth on one side had all fallen out, many of their sockets being obliterated. It was not, however, by any means increased in weight.

Mr. Sutton then referred to the tumour germs, as described by Virchow, and, from the numerous specimens he had examined, gave acceptance to the views of that distinguished observer.

Considerable discussion ensued, after which Mr. Sutton replied.

Dr. G. W. Field described and exhibited an Electric Dental Engine. The armature and magnets are so compactly put together as to give outside measurement of its weight 10½ ozs. The hand-piece has a universal chuck. The noise whilst in use is not worthy of notice.

The battery employed by Dr. Field for both the engine and the electric mallet is one supplied by Messrs. Coxeter and Nehmer, of Grafton Street, W.C. With their silico carbons two feet in length and three inches thick their size gives a large quantity current; and, having a very high electromotive force, the cells may be placed in any part of the house distant from the operating room, and that, too, without any appreciable loss of strength. As there are no acids used there are no fumes, so, if need be, the battery may be kept in the operating room.

This new form of battery does an immense amount of work, and does not require frequent re-charging.

Dr. Field has in constant use (*i.e.*, five to six hours per day) twelve cells. By means of a shunt he can use the whole number on either half (six), and at this high daily average—say five hours—the battery has worked satisfactorily during six weeks. Two or three days per week it is in use three to five hours consecutively with the electric mallet. In ordinary use it should work about three months.

BRITISH DENTAL ASSOCIATION.

MIDLAND COUNTIES BRANCH.

The Annual Meeting of this Branch was held at the University Buildings, on April 16th. The proceedings commenced by a formal reception at the Castle by Mr. Councillor McCraith, after which the business of the meeting began at eleven o'clock, Mr. J. Harrison, Sheffield, in the Chair.

The report of the Council having been read by Dr. Waite, the retiring President gave a short address, and vacated the chair in favour of the newly-elected President, Mr. Henry Blandy.

Mr. A. M. Matthews, Bradford, was chosen President-Elect; and it was decided to hold the next annual meeting at Bradford.

The President moved, and the Ex-President seconded, the following resolution, which was carried:—"The members of the

Midland branch of the British Dental Association having learned that the Secretary is about to meet the Dental Society of New York, at their annual meeting in May, desire to convey through him expressions of esteem and fraternal greeting towards the Dental profession in America."

Mr. Brunton, of Leeds, demonstrated his mode of cooking vulcanite plates in steotyte ; and Mr. W. Bowman Macleod also gave a demonstration of taking models in plaster. An operation was performed by Mr. F. R. H. King, of Newark, of filling an upper bicuspid tooth by Herbst's method.

THE PRESIDENT'S ADDRESS.

The President, after thanking the meeting for the honour done to him, observed that any profession, science or trade must advance by the constant meeting together of its members, for there was nothing like friction for polishing. They found associations of kindred souls in full operation in the great world of science, and therefore, they heartily welcomed the members of the Midland Branch to Nottingham. It has been said of surgery, that it is a sorry trade, but a noble profession. So is it true of dentistry. So far as their lives were spent in combating and mitigating the sufferings of their fellow-beings, in prolonging life and making it more enjoyable, they were fulfilling a great part in the art of healing. The more faithfully they did their work, the more they knew of its capabilities, the more service would they be to mankind, and the more would they be appreciated by a grateful public. The dentist would no longer be looked upon as a necessary evil, but be hailed as a positive good. Since a President's address is generally looked upon as a quasi-professional and quasi-public utterance, it may be interesting to that public whom they served, and possibly to some of their younger members, to learn who and what the British Dental Association is. Some thirty years or more ago, any one was good enough to be a dentist—just as till lately, any one could keep a school. In the museum of the Odontological Society is an old sign, which reads thus: —

> "THOS. SMITH, Glazier, Let Blood and Draw
> Teeth att 3. Tea Kittles and Potts, Buckets,
> Lantrens, Cups to be Handled Heare."

In 1815, and in succeeding years, sundry medical Acts were passed, all tending more or less to the reform and elevation of the medical profession, by demanding that every doctor or surgeon should be registered, and all entering the profession should be properly educated according to a prescribed curriculum and pass examinations for diplomas before registration. This was a great public necessity—it was monstrous that the public should be unable to distinguish between a quack doctor or charlatan who professed to cure all diseases without seeing the patient, and by means of one bottle of patent medicine, and the scientific and educated man, whose modesty forbade him to indulge in such self laudation. For the last thirty years the Dental profession has been undergoing the same process of reformation and elimination. A band of self-denying and energetic men came to the rescue, foremost amongst whom was our venerable friend, Mr. John Tomes, whose name will be known over the whole scientific world for his valuable work as an anatomical and physiological investigator no doubt, but it will be always dear in the remembrance of his brother dentists as the pioneer and champion of dental reform. This band ranged themselves side by side and fought their battles through thick and thin. They sought to make the dentist an educated scientific man, who at least should know his own profession thoroughly. They would have him pass an examination in arts identical with that demanded of the students of medicine. They required an apprenticeship of three years at least to a registered and qualified practitioner, which is in excess of the education demanded of the medical student, and they required a three years' course of hospital study in medicine and surgery, &c., as well as courses on special dental subjects in a Dental hospital. This was granted at last by the College of Surgeons, and a curriculum of study marked out for their diplomas. For years the profession and the public were apathetic, but steadily and unremittingly did these apostles of reform pursue their course, until in 1878 they obtained the Dentists' Act. This Act demanded registration of all persons practising dentistry. It included not only the big fish, but the little, nay it even went down to minnows and tittlebats, and included also some bacilli and microbes—parasites from whom we now suffer. All vested interests had to be recognised, but this was a beginning of the end. Any person not so registered on the 1st August, 1879, could not use the name or title of dentist, or recover fees, under penalty, while after that date only licentiates in dentistry of a College of Surgeons, or qualified medical practitioners, could register or practise dentistry. Having glanced further at the formation of the British Dental Association, the President added that its objects include not only the study of dental and the allied sciences, the maintenance of the honour and interests of the Dental profession, and the publication of a periodical journal, but the maintenance of the spirit and provisions of the Dentists' Act. They had amongst them those who had been and were earnest workers in the field of science, who went to the fountain head with their scalpel and microscope, and probed nature to her most secret depths in order to discover if possible the causes of the manifestations of disease. What was known as the germ theory had become a great modern fact. Bacilli and micrococci has been found in the mouth, and in the tissue of decayed teeth, as also in alveolar abscesses; and, when it was fully realised how extremely rapidly they multiply, it would be seen how important a bearing they might have in dental diseases. When would it be as universally recognised that the first stage of digestion commenced in the mouth, and that people must have sound and healthy teeth, or endless suffering must result? Sound and healthy teeth, how could they get them, and having, keep them? Could they breed sound teeth like a particular feather in a pigeon? Those lines, "The sins of the fathers shall be visited upon the children to the third and fourth generation" seem hard, but when they pondered over the hereditary character of form, feature, and disease, they saw how true they were. The first step of the infant on the ladder was too often a downward one, for the child had not a fair start. How often they found a family with contracted mouths; or were confronted by a young mouth in a most deplorable state, and the mother imploringly asking how it was and what could be done. They did not like to be personal and say it was too late, that it was the result of an unfortunate marriage, of the immature or impaired constitution of one of the parents, of tubercular disease, or of a plentiful sowing of wild oats, perhaps a generation or two ago, whose harvest was yet to be reaped; or as *Punch* wittily, yet truly, put it from the mouth of an odd-looking, dwarfed youth, whose parents complained to him of his stunted, ill appearance:—"The fact is, Ma, you ought not to have married Pa; you would have treated your dogs better." They saw that truth exemplified in the children's hospitals constantly, and they were powerless to prevent it. No Act of Parliament could so far interfere with the liberty of the subject as to legislate for proper physical marriages, and it was only by drawing attention to the subject now and again as opportunity served that possibly something might be done for future generations. The position of the social reformer was not a pleasant one. There was a great deal going on in this matter of social reform, by means of social guilds, girls' friendly societies, etc., mainly supported and worked by young ladies. There was one way in which young ladies and the community generally might do great good, and that was by giving the cold shoulder to fast young men who lounge about places of amusement sowing wild oats. It was not necessary that a crop should be sown ; and it was as monstrous as it was cruel that a young man having sown them to his heart's content should then seek the hand of some pure and beautiful girl to settle down in life with. We could only point a finger to it with mournful regret. The President then proceeded to point out the process of dental deterioration, giving various illustrations in confirmation of his observations. Their object was, not to promote the growth of sound and healthy teeth as sound and healthy children. He concluded with welcoming the members to Nottingham.

Dr. Smith (Edinburgh), President of the British Dental Association, in proposing a vote of thanks to Mr. Blandy for his able, instructive and interesting paper, said he (Dr. Smith), was old enough to have had personal experience in much of the reform which had been so graphically described. He remembered when the dentists of a small town were as much strangers to each other as the dentists of Nottingham and the dentists of Edinburgh were now, except when a little animosity brought them into contact. With regard to Dental reform, many of the older dentists saw how much advantage had accrued to the profession by the Dental reforms recently introduced, and the profession, as a body, were raised to a higher position than existed thirty years ago, and too the education of individual members was incomparably greater than it was ten years since. Mr. Blandy had alluded to the Dentists' Act as one which was better than nothing at all, though it was not quite perfect. It was difficult to get any Act perfect, especially at the first, and they must take the Dentists' Act for what it was worth, and admit that it had greatly improved the state of things that existed before it came into force. And inasmuch as it was the first Dentists' Act for Great

Britain, they must accept it to a certain extent as a tentative measure. Experience had shown them what improvements could be made in it. With regard to Dental prosecutions, he thought that the onus ought not to be left to private individuals, but that the Association should authorise them. For his part he should not prosecute in his own name, and it was an invidious duty to impose on any individual, as the wrong construction in many cases was placed upon it, and the action was imputed to professional jealousy. With reference to advertising, the matter was exceedingly difficult to manage, and it had been admitted by the colleges that proceedings could not be taken against those who advertised, nor could they be deprived of their diplomas. The objects of the British Dental Association were extremely good, and he was sorry to find that all the registered dentists had not joined it. It was more than an Odontological Society. It partook rather of the nature of a college, being for the promotion of the best interests of the profession generally. It did not give, nor pretend to give diplomas, but it exercised a healthy supervision. Dr. Smith concluded by saying that prosecutions undertaken by the Association would have a strong deterrent effect.

Mr. J. C. Storey (Hull), who seconded the resolution, thought that if a circular letter were sent to all hospitals not at present availing themselves of a Dental surgeon's skill, calling attention to the fact, it would be of obvious service.

The vote of thanks was carried.

Mr. G. E. Brunton (Leeds) did not sympathise with Mr. Storey. He did not think it was their duty as a young Association to forward anything like a request. Any action on their part in that line, he thought, would be looked upon as presumptive. Perhaps it would be better if hospital surgeons knew a little more about Dental surgery, and he hoped they would soon look upon it as their duty to join the classes at Dental Schools.

Dr. L. W. Marshall read a paper on "Nutrition in Early Life as Affecting the Teeth." The practice of unlimited early extraction of teeth was condemned as one of the chief causes of mal-nutrition in after life. A cordial co-operation between the dentist and the doctor was urged. Attention was called to early errors in children's diet, Dr. Marshall stating that it required the greatest skill and acumen to prescribe for children food which should easily assimilate, and not develop secretions in the mouth which would destroy the teeth. Milk in some form was the only food that should be employed in very early life. Farinaceous foods, he thought, had been rather over-rated, and their abuse very often tended to great trouble. The development of dental caries, he thought, could be avoided, for he was sure that it might be attributed to imperfect teeth formation, upon which followed early decay.

A discussion ensued, and Dr. Smith held that local influences were those which had most control over the teeth formation and decay. Amongst those taking part in the discussion were Mr. C. S. Tomes (London), Mr. Oakley Coles (London), Mr. J. Smith-Turner (London).

Major Stewart (Liverpool) asked how it was that, amongst a whole family of children, those who were deficient in physical power had superior teeth, and required little or no dental attention.

Mr. King said he had noticed the circumstance which Major Stewart alluded to, but he thought it merely accidental, and not the rule by any means.

In replying, Dr. Marshall said he did not come to teach the Association how to cure dental caries, but if he had directed attention to the consideration of certain matters affecting the formation of teeth in regard to the earlier stages, his object had been attained. He did not accept Major Stewart's belief that delicate children had, as a rule, the best teeth. Finally, Dr. Marshall thanked Dr. Smith for his practical acquiesence in the suggestions thrown out in the paper, and also returned thanks to the Association for their reception of his paper. A vote of thanks was passed to Dr. Marshall.

Mr. F. Harrison, M.R.C.S., L.D.S. (Sheffield), read a paper on "Preparing Tissues for Microscopical Examination," which was illustrated by an experiment. It was of an entirely technical character, and evoked much attention from those present.

Mr. L. Matheson, L.D.S., read a paper on "The Artificial Separation of Teeth as a Means of Facilitating Filling, and as a Permanent Operation for the Prevention of Decay." A discussion followed on this subject, and after votes of thanks had been passed the meeting separated.

The Dinner.

A dinner in connection with the Annual Conference took place at the George Hotel in the evening, the President, Mr. Blandy, in the chair.

After the usual loyal toasts had been honoured,

Dr. Burnie gave "The British Dental Association and its Branches," said that its objects were to promote the study of dental and the allied sciences, and to elevate the status of the members of the Dental profession individually and collectively. The Association was youthful in age, but it numbered already many hundreds of members, and those the *élite* of the Dental profession.

Dr. Smith (Edinburgh), in responding on behalf of the Association, said that compliment rendered in such a manner was one which the Association fully appreciated and would highly value. He wished that every registered practitioner would join the Association, for it was absolutely necessary to enforce the provisions and penalties contained in the Dental Act. This Act was different from the Medical Act, as throughout the civilised world there were bodies of men ready to take up action against unprincipled medical practitioners, and he thought that dental practitioners should be similarly united for common protection.

Mr. F. Canton, who also replied, said to those who knew how largely the success of the Association depended upon its branches, the meeting held that day of the Midland branch must be most gratifying. It was often said, what was the use of a Dental Association? Ten years ago he did not think it would have been possible to have had the meetings that had been held during the past five or six years. The Association had been the means of bringing these things about; and it had also been the means of bringing about a far better and more friendly disposition individually amongst members of the profession. He trusted that every effort would be made to maintain a high status for the Association, as there were a large number jealously watching, and if they saw anything to find fault with, it would give them great satisfaction.

Other toasts followed, after which the company separated.

DENTAL HOSPITAL OF EXETER.

The Annual General Meeting of Governors and Subscribers was held on March 19th. The Fifth Annual Report of the Committee of Management stated that the number of cases treated had been somewhat less than in the preceding year, but is still very large, considerably more than five thousand having received attention during the twelve months.

Number of Patients			3,823
Extractions...	Children under 14	1,189	
	Adults	2,630	
	Under Nitrous Oxide and other Anæsthetics	230	
			4,049
Stoppings ...	With Gold	48	
	With White Foil	25	
	With Plastic Material	707	
			780
Miscellaneous—Irregularities of the Teeth, Scaling, &c.			526
Total			5,355

The accounts show a small balance of £1 16s. 4d. in favour of the Institution; but the Committee regret to notice a falling off in the amount of the annual subscriptions, the receipts for the year being £145 14s. 8d., and the expenses £143 18s. 4d.

The amount received from Life Governors up to the present date is £110; of this the Committee have been able to invest £85, and they hope in time to make up the remainder, which they were compelled to use for necessary expenses when the Hospital was first opened. The Committee hope that this sum may form the nucleus of a fund for providing the Dental Hospital with a building of its own. The Institution is now in the sixth year of its existence, and may therefore be considered permanently established among the charities of the city of Exeter; this being so, the Committee feel that the time is coming when it will be their duty to endeavour to bring about this very desirable result. They would then be able to extend the usefulness of the Hospital, and they therefore invite special contributions to be added to the Life Governors' Donations, which will help to form what they hope may eventually become a "Building Fund."

EXAMINATION QUESTIONS.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE following questions were given at the Final written examination for the L.D.S. on the 23rd ult:—

SURGERY.

1. Explain the occurrence of Inflammation in the Submaxillary and Cervical Glands from Dental Irritation.

2. Describe the causes, progress and treatment of Necrosis, and how it differs from Caries, in a long bone such as the Tibia.

MEDICINE AND MATERIA MEDICA.

1. What do you understand by Sporadic, Endemic and Epidemic Diseases? and give an example of each.
2. Give in a general manner the symptoms, pathology and treatment of Cerebral Apoplexy.

DENTAL ANATOMY AND PHYSIOLOGY.

1. What is the percentage of Animal and Earthy Matter in Healthy Human Dentine, and of what substance does the Earthy Substance consist?
2. What is the average date at which the Eruption of each class of Tooth in the (*a*) temporary and (*b*) permanent set is completed?
3. What are the chief distinctive peculiarities in the dentition of the Edentata, Rodentia and Cetacea? and mention an example of each.

DENTAL SURGERY AND PATHOLOGY.

1. What is a Cyst, and to what class of Cysts do Dentigerous Cysts belong, and to what secondary changes are Cysts liable?
2. Give the histological and pathological peculiarities of Epulis, stating to what class of tumours it belongs.
3. In what cases besides those arising from Caries may Extraction of the Wisdom Teeth, upper and lower, be required? and what complications and difficulties may present themselves in the operation?

JOURNALISTIC SUMMARY.

THE DENTAL COSMOS. *(April, PHILADELPHIA.)*

"The Depressed Matrix," by Dr. Louis Jack. Having referred to the advantages of contour filling, the writer says:—"When the use of matrices was first practised, they were advocated as a means to fill principally the distal cavities, because of their extreme difficulty and the impossibility of securing excellent results in positions where it was nearly impossible to make the proper application of force. Since then a larger practice of the method has shown that the plan is equally or even more satisfactory for all proximate cavities of more than medium size in the bicuspids and molars. As several important changes have been made in the form of the matrix, of the instruments to be used, and of the details of the method, it will be necessary to give a new description of the whole procedure, which will be as concise as circumstances will permit." He then deals with the separation of teeth, the preparation of the cavity, the adaptation of the matrix, the preparation of gold, packing the gold, finishing, the combined use of gutta-percha and phosphate of zinc, amalgam fillings, combined tin and amalgam fillings.

The Report of the January Meeting of the New York Odontological Society contains an account of "Hydrochlorate of Cocaine as a Local Anæsthetic in Dental Surgery," by Dr. E. H. Raymond. Dentally considered, there has not been that general satisfaction that has followed its use in other specialties. The hard character of the dentine seems to prevent the absorption of a sufficient amount of the agent to produce anæsthesia. It seems, therefore, to follow that, instead of going from the periphery to the centre, you can only get local anæsthesia of the teeth with the drug by going from the centre to the periphery. This can only be accomplished by hypodermic injection. By bringing the agent in contact with the nerve-trunk you will get partial, if not total, insensibility throughout its ramifications.

Professor Mayr made a communication on "The Products of Putrefaction and Fermentation in the Mouth," upon which a long discussion ensued.

At the February Meeting of the First District Dental Society, New York, Dr. W. H. Atkinson read a paper entitled, "DOES PREGNANCY ACT AS A DIRECT ANTECEDENT TO DECAY OF THE TEETH?" upon which a discussion ensued.

At the January Meeting of the Odontological Society of Pennsylvania, Dr. Thomas read a paper upon "THE PRACTICE OF EXTRACTING TEETH WITH NITROUS OXIDE GAS AS A SPECIALITY." An abstract of the paper is given in the *Cosmos*.

THE ARCHIVES OF DENTISTRY. *(April, ST. LOUIS.)*

The first article is a critical and somewhat severe review, by Dr. F. Searle, of Mr. Henry Sewill's work on "Dental Caries."

Regarding this article the Editor says, "We call the attention of our readers to Dr. Searle's review of Mr. Sewill's book on 'Dental Caries.' The author of this book not only disputes the theory of decay set forth by recent writers on this subject, but he also denies the accuracy of their observations under the microscope. Dr. Searle meets these objections in a very complete and satisfactory manner, and his paper presents a clear and very distinct idea of the points raised by Mr. Sewill, and the opposite views largely held on this side of the Atlantic. It is profitable reading."

"CONCERNING REPRESENTATION IN THE INTERNATIONAL MEDICAL CONGRESS," by Dr. J. Richardson.

Report of the February Meeting of the Chicago Dental Society.

THE INDEPENDENT PRACTITIONER. *(April, NEW YORK.)*

"A DISCUSSION ON SOME QUESTIONS IN DENTAL CARIES," by Dr. Miller. The writer criticises the discussions which have from time to time been published upon his series of papers which have appeared in this journal and also in the *Dental Record.* He here makes his statements still more emphatic, and reasserts that micro-organisms can and often do not only distend separate dentinal tubules, but push whole tubules aside; fungi do possess the power of dissolving the decalcified dentine—or digesting it, if you please—but not a single fact can as yet be produced to show that they can soften normal dentine either directly or by means of any ferment which they produce. He has proved that the softening of the dentine in caries is nothing more nor less than a simple decalcification; that the acids by which it is produced may be readily detected about decaying teeth; that these acids are formed by the action of certain micro-organisms which, being independent of the presence of air, may form acids within the substance of the dentine. Furthermore, that the same fungi have the power of dissolving softened dentine. I have shown that the fungi of dental caries produce, first an inverting ferment, and secondly an acid-producing ferment, and thirdly (by experiments soon to be published) a peptonizing ferment. I have furthermore shown that there is a fungus in the human mouth which, when injected into the blood vessels of small animals, produces blood-poisoning, demonstrating that it does, no doubt, produce a toxic agent, but this certainly would not justify the inference that all or any of the fungi of caries produce toxic agents, or that such agents have any effect upon sound dentine.

"THE COMMA BACILLUS OF ASIATIC CHOLERA," by George W. Lewis, Jun. The object of this paper is to describe as lucidly as possible Comma Bacillus of Asiatic Cholera. Although comparatively little is known of the life history of the Comma Bacillus, we are nevertheless able to detect in it a striking relation to the cholera process; the fact that the organism reaches its fullest development in a single day coincides with the almost phenomenal progress which is made in the disease in a similar time; then, too, the loss of form which quickly follows after it has reached the maximum growth, would seem to imply a corresponding loss of power. While the disease is at its height the excreta contains enormous quantities of Comma Bacilli with very few other bacteria. Later on, when a favourable change in the condition of the patient is induced, examination reveals a marked decrease in the former and a corresponding increase in the latter. After complete recovery no Comma Bacilli are to be found.

"THE WORLD'S EXPOSITIONS" is a short article by Mrs. M. W. J.

"THE CONSTRUCTION OF SUERSEN'S OBDURATORS" is the title of an article contributed by Dr. Theobald Weber, and "DENS SAPIENTIÆ," by Dr. J. W. Clowes.

"MURIATE OF COCAINE," by Dr. W. D. Miller. It may be used to advantage in performing operations upon the dental pulp, and for anæsthetizing the sometimes extremely sensitive and painful gum before applying the rubber dam. Though it is a valuable addition to the dental pharmacopœia, it is by no means one of unlimited value. Dr. Sachs writes that he has used it with the greatest satisfaction in cases where the sensitiveness of the soft parts is so great as to render the operation of taking an impression exceedingly disagreeable, if not impossible. He says he paints the soft parts and the parts surrounding the soft palate, with a two per cent. solution, and after about one minute he is able to take a good impression without the least difficulty.

"PRACTITIONER AND INSTRUCTOR," by Dr. C. E. H. Phillips. This is a short article referring particularly to the instruction of parents and the treatment of deciduous teeth.

"The Painless Removal of Living Pulp," by Dr. G. M. Merritt. My method is as follows: we will suppose that a superior central incisor has the crown decayed and broken away, yet possessed of a live, healthy pulp, well covered with dentine. With a stump corundum, while kept wet, I grind the end of the root down until the patient manifests a disposition to flinch, owing to the close proximity of the stone to the pulp. I then put a Morey nerve canal drill in the hand piece, and keep it in readiness. Saturating a pledget of cotton with ether, and holding it on the end of the root and surrounding gum for one minute, I remove it and quickly place my drill in the centre of the end of the root, and with a few quick turns of the engine I am able to penetrate quite to the apex without a particle of pain or a word of remonstrance from the patient. This operation I have performed a great many times and have never had but one patient say that it occasioned pain.

"Cocaine in Dental Work" is the subject of an Editorial article. Cocaine is not all that the profession has been looking for and hoping for ; it is not entirely reliable as an obtundent of dental tissue. It is a local anæsthetic, probably the most potent in its effects upon soft tissues of anything yet discovered. Its results are, however, principally confined to such tissues as have a distinct nervous supply. It has no more effect upon nerveless tissue than many other things that might be named. For obtunding dentine it is of no more use than are some anæsthetics that are not local anæsthetics at all.

CORRESPONDENCE.

LIVERPOOL DENTAL HOSPITAL.

To the Editor of the Dental Record.

Dear Sir,—Be good enough to allow me a little space in your pages to ventilate a grievance that, it seems to me, touches every respectable member of the profession very nearly.

I was one of the Honorary Dental Surgeons at the Liverpool Dental Hospital until Easter, but about that time circumstances arose to cause myself and all my colleagues to tender our resignations, which were accepted by the Committee. The *casus belli* was as follows:—Having advertised for Assistant Honorary Dental Surgeons, four men sent in their applications, which we—the Medical Board—discussed, and selected *three* as suitable to be recommended to the General Committee for election ; and put one out of the question, as we considered that he did not quite conform his practice to the modern notions of Dental Ethics.

At the meeting of the Committee, before even our recommendation was brought forward, a gentleman rose to his feet and demanded the election of the very man whom we had considered unsuitable for election, saying that the Committee had promised on a former occasion, when the same individual had been thrown out, that if he applied again he should be considered first.

We protested against the informality of the proceedings, and stated that the gentleman in question was the very one we had *not* seen fit to recommend. In spite of this, however, votes were taken ; the lay members outnumbered us, though we were all there with two exceptions, and the individual in question was elected by a majority. None of the members of the staff voted for him.

We considered that the Committee had made it impossible for us to attend there again, unless some new arrangement was come to, after the slight we had been subjected to ; and a few days afterwards sent a letter, signed by all of us, tendering our resignations unless the obnoxious party was removed.

We were answered by a request to meet the Chairman and discuss the matter quietly. We said on this occasion that it was the *principle* we upheld, and must refuse to take office again unless the Committee were willing to consider our will as absolute on all matters appertaining strictly to the management.

They took time to consider the subject, and eventually we received letters accepting our resignations.

At present I do not know how the work is done at the Hospital, because the newly-created assistants have followed our lead, as well as one of the stipendiaries.

I hope your readers will try and assist us to a satisfactory settlement of this difficulty, as it is with that object I ventilate the case.—Believe me, yours faithfully, ONE OF THE LATE STAFF.

Liverpool, April 24th, 1885.

THE utility of the Harden "Star" Hand Grenade in extinguishing fire is beyond question. The Grenade consists of a glass bottle holding a pint of liquid, which is harmless either to flesh or fabric. By breaking the bottle and throwing the contents into fire, a great quantity of gas is generated, which immediately extinguishes the fire. The recent experiments on the Thames Embankment demonstrated the almost instantaneous suppression of fierce fires by means of two or three Grenades.

Editorial.

LIVERPOOL DENTAL HOSPITAL.

WHERE there exists a want of harmony between the Medical and the lay members of the Committee of a Hospital, the institution cannot flourish as it otherwise might. The Medical and the General Committee of the Dental Hospital of Liverpool have, unfortunately, so far strained their relations that a rupture has taken place. As a consequence of a misunderstanding, it might be over-zeal on the part of the General Committee, the Medical Staff have resigned *en masse*, and the usefulness of the Charity and the efficiency of the School are necessarily impaired. The donors, also, must be disappointed, the suffering poor of the district slighted, the students disregarded, and much animosity and ridicule excited. The letter by " One of the late Staff," page 236, gives the history of this deadlock, and some of the local papers also have alluded to the subject.

That a General Committee should persist in forcing upon the Medical Staff of a Hospital one who is unanimously objected to as a colleague is opposed to good sense. It is equivalent to an expression of want of confidence, and may be a diplomatic way of getting rid of old servants. But it should be remembered that a Dental Hospital is altogether different from any other. The great usefulness of a Dental Hospital largely depends upon the students, who, mainly, have to do the work. Therefore the teaching power of the school has to be good to be attractive, especially in these days, when there are many Dental Schools. And though a local contemporary has " no doubt but that there will be many applicants for the position of honorary Dental surgeon to the Liverpool Dental Hospital—a position which carries weight amongst the thinking portion of the population, and adds a certain dignity to its possessor," we would urge that it is not the quantity, but rather the quality, of Medical Officers upon which depends the success of a Dental Hospital and School.

Liverpool is not the only place where discord has been thus aroused between the two Committees of similar charitable institutions. In two instances which occurred in London there was considerable indignation enkindled, but it is hoped that, guided by past experience, such will not recur. We trust the authorities of the Liverpool Dental Hospital will not lose either time or any opportunity in satisfactorily settling the present difficulty, and promoting the success which was attending the efforts of the late Staff in organising an efficient school.

GOSSIP.

SOUND can be not only reflected, but refracted and condensed. It can also be diffracted or bent round obstacles. Echoes are reflected waves. Echo may be prevented by cutting off the angles of the room with drapery, by wires stretched across the room to break the waves of sound, and, in fact, by any device which will interrupt the reflection of the sound waves.

MR. S. LEE RYMER, L.D.S.Eng., has been appointed to the Commission of the Peace for the Borough of Croydon.

The Scientific American gives Stolla's process of nickel plating as follows:—Into the plating vessel—which may be of porcelain, but preferably of copper—is placed a concentrated solution of zinc chloride, which is then diluted with from one to two volumes of water, and heated to boiling. If any precipitate separates, it is to be redissolved by adding a few drops of hydrochloric acid. As much powdered zinc as can be taken on the point of a knife is thrown in, by which the vessel becomes covered internally with a coating of zinc. The nickel salt, either the chloride or the sulphate, is then added until the liquid is distinctly green, and the articles to be plated, previously thoroughly cleaned, are introduced, together with some fragments of zinc. The boiling is continued for fifteen minutes, when the coating of nickel is completed and the process finished. The articles are well washed with water and cleaned with chalk.

THE use of artificial teeth by the Ancients is not a new discovery. A correspondent to *Nature* writes:—"Cicero, De Legib. II., 24, quotes a law from the Twelve Tables forbidding the combustion or burial of costly golden articles, but allowing an exception in favour of 'teeth fastened with gold.' *(Quoi auro dentes vincti escunt, &c.)*."

MR. FRANCIS DAY, who has been studying the breeding of salmon in land-locked fresh water ponds, considers the following points to be established:—That male parrs or smolts may afford milt capable to fertilise ova; but, if taken from fish in their second season at thirty-two months of age, they are of insufficient power to produce vigorous fry. That female smolts, or grilse, may give eggs at thirty-two months of age, but those a season older are better adapted for the production of vigorous fry, where, to develop ova, a visit to the sea is not a physiological necessity. That young male salmon are more matured for breeding purposes than are young females of the same season's growth. That female salmonidæ under twenty-four months of age, although they may give ova, most are of little use for breeding purposes, the young, if produced, being generally weak or malformed. That at Howietoun, so far, hybrids between trout and salmon have proved to be sterile.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, from March 1st to March 31st, 1885:—

		National.		London.
Number of Patients attended	...	1,622	...	—
Extractions	Children under 14 ...	365	...	451
	Adults	505	...	986
	Under Nitrous Oxide	552	...	550
Gold Stoppings	... ...	80	...	291
Other Stoppings	... ...	621	...	897
Advice and Scaling	... ...	214	...	127
Irregularities of the Teeth	...	188	...	185
Miscellaneous	... ...	116	...	440
Total	... ...	2,641	...	3,927

THE

DENTAL RECORD.

VOL. V. JUNE 1, 1885. No. 6.

REVIEW OF BOOKS.

DENTAL SURGERY FOR GENERAL PRACTITIONERS AND STUDENTS OF MEDICINE. By Ashley W. Barrett, M.B. (Lond.), M.R.C.S., L.D.S.Eng. London: H. K. Lewis.

THIS book is one of "Lewis's Practical Series." The work is intended to meet the requirements of the general practitioner and the student of medicine. To such matters as the filling of teeth with gold, the pivoting of mineral crowns, and to others which fall only within the scope of the specialist, reference is intentionally omitted. A complete, terse, and practical outline of the more common operations in Dental surgery, especially of those which the General Practitioner should be somewhat familiar with, is often inquired for. Though such a work has not been unknown, there is ample field for the volume Mr. Barrett has produced. Brevity has its advantages, and it is in keeping with the objects of this book; but cogent reasons and instructive observations are too valuable to be sacrificed merely for the sake of being brief. This is the case here, and must be regarded as an item of weakness rather than adding to the completeness of the work. For instance, there are other reasons for retaining the temporary teeth besides their use as masticators. Their premature extraction has an important influence upon the regularity of the succeeding permanent teeth, particularly of the canines and bicuspids. The omission of reference to this reason against the premature extraction of the temporary teeth is observable in the first and in the fourth chapters. It is especially desirable that the General Practitioner, who may occasionally use the tooth forceps, should have laid before him at least the motives, if not the arguments, for what would probably be not a small portion of his Dental practice.

Besides size and colour of the temporary teeth, their thicker edge of enamel and the more constricted neck are distinctive points of difference from the permanent teeth. There is also omitted reference to dentigerous cyst, which is a definite sequence of the retarded eruption of teeth, which subject is treated at page 10.

Of Dental caries the author writes:—"Dental decay is far more prevalent among the civilized races of the present day than among the aboriginal tribes of Africa, America, and Australia; also an examination of ancient skulls proves it to be one of the incidents of advancing civilization. This is the outcome of several causes: such as the preservation of the weakly and their greater reproduction that now obtains; the general lessening of bodily vigour and development that is apt to go with increased mental cultivation, and the smaller need for Dental organs that comes from improvement in the quality and preparation of modern food. It is perhaps not easy to say what degree of value should be set upon this last, but certain it is that the teeth and jaws of to-day have far less work thrown upon them than in times when man lived upon roots and imperfectly prepared coarse flesh, and we may assume that the development of the teeth, as of other organs, varies with the amount of labour they are called upon to perform. The frequent absence of one or more of the third molars, their often late eruption, and their commonly dwarfed size, the increase of Dental caries, and the tendency to early shedding of the teeth from absorption of their alveolar sockets, all suggest that the Dental organs of civilized man are tending to become rudimentary."

Among the local conditions predisposing to decay, there is stated the abrasion and crushing of the enamel from overcrowding of the teeth. "The abrasion of enamel which favours decay occurs in crowded mouths upon the lateral surfaces of bicuspids, which by their slight mobility during mastication are rendered liable to such injury." The opinion thus expressed is entertained by a few practitioners, but it is opposed by antithesis which is supported by considerable evidence.

Of the micro-organisms found in connection with carious dentine, leptothryx only is mentioned; bacteria, bacilli, and micrococci are not referred to.

On page 40 the author says that he has "never yet met with periodontitis, attended with suppuration, around the fangs of teeth containing vital nerves." What of pyorrhœa alveolaris? It is also an exception rather than the rule to find, as stated at pages 41 and 51, the pus from an alveolar abscess escape around the neck of the affected tooth.

There are several other observations which many "authorities" would differ from, and among them may be mentioned "the absolute inutility of applying escharotics or counter-irritants to the gum overlying the affected part" for the relief of acute periodontitis, also, guard against an extracted tooth or stump from accidentally slipping into the trachea of an anæsthetised patient "by carefully folding a mouth napkin within the mouth behind the tooth or stumps that are about to be removed."

We would especially emphasize the serious physiological error and the most dangerous teaching of the following sentence:—"The administration of chloroform for Dental purposes should never be pushed to any extent, and before stertor and relaxation of the muscles show that the third stage of anæsthesia has been reached . . . . the operation is completed, and thus, while the sense of pain is dulled or entirely removed, we avoid causing that nausea and prostration which generally follow upon a large use of chloroform." If it were fully recognised that a small dose of chloroform is most dangerous in case of any operation, there would be fewer deaths from shock ensuing upon its partial administration.

Though the proof-sheets have been revised by the Author's brother, as noted in the preface, the book is not free from faults of punctuation, grammar, and awkward sentences. A smile is provoked when we read, at page 59, that the operator "should stand with feet well separated by the *right hand* of his patient."

CROWN, BAR, AND BRIDGE-WORK: New Methods of permanently adjusting Artificial Teeth without Plates. By Isidore E. Clifford and R. E. Clifford. London: Simpkin, Marshall & Co.

THIS is a pamphlet of twenty-six pages of letterpress and ten litho plates containing forty-eight illustrations, "to explain to the Medical Profession, and those interested in the subject, the advantages of the system of dentistry known as Crown, Bar, and Bridge-Work," a system that "has hitherto not been introduced into England." The writers also state that "for the last thirty years in England dentistry has made little or no progress." "In England, the few dentists who have known of these processes have been kept from adopting them by a natural Conservatism, which made them prefer familiar methods, instead of learning late in life a new and more difficult kind of work." These assertions need not be replied to here.

Regarding the principles and virtues of bridge-work, it is opportune that we can refer the reader to the proceedings of the Odontological Society, as reported at page 273 of this number of the *Dental Record*. Therefore there is no necessity to discuss the subject now, even if the book under notice, with the obvious object of its publication, justified such a course.

EXAMINATION OF THE TEETH.

By W. J. Pidgeon, L.D.S.Eng.

It is difficult to persuade patients to pay regular periodical visits for the examination of their teeth. Even when they appear convinced that such a course is the right one, they are but too apt to postpone the visit to the Dentist until they suffer some uneasiness or pain. They put off the evil day, and try to persuade themselves that all is well with their teeth till they feel some discomfort in them. It is therefore necessary that we should educate our patients into the habit of making periodical visits, regulated by our judgment in accordance with the requirements of the case, and that we should examine their teeth thoroughly at those times, so that they may not lose faith in the method we recommend.

No doubt many teeth are lost through these examinations being hastily performed. Certain cavities escape notice, and the patient goes home in false security, supposing his teeth will be safe till the next appointed visit for examination. If before that time arrives the caries penetrate deeply, pain is suffered, the patient's confidence in the Dentist, if not in dentistry, is impaired, and in some cases even loss of teeth results. Time is saved at first, but much more is lost in the end.

The situations in which cavities are most liable to be overlooked are on the mesial and distal surfaces of the bicuspids and molars. In these positions very delicate instruments may be necessary for their discovery. When caries occurs in such places, near the grinding surface of the tooth, it produces a change of colour in the enamel overlying it which leads to its detection ; but the cavity may be too far removed from this surface to produce such an effect. It is then that it is liable to remain unseen unless a very careful examination be made.

When a cavity has been discovered in such a hidden position, it is well to examine the same spot in the fellow tooth on the opposite side of the mouth, as fellow teeth will often be found affected by the same weak points. When the teeth of one side of the jaw have been examined this fact serves as a guide for the detection of decay in the teeth of the other side, and by comparing them we may arrive at more certain results. By this means there is less risk of cavities being overlooked.

Patients may be given a card, at the conclusion of the treatment of their case, on which might be stated certain details for future reference, together with the present date and the approximate one for their next visit. These entries would serve to show them that they are expected to keep the card and present it at about the dated time. It would assist in giving them a sense of co-responsibility with the Dentist for their own good, and thus be a means of gaining respect for our instructions.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. Boyd Wallis, L.D.S.Eng., &c.

(Continued from page 109).

Electric Lamps.—The excitement created some few years since by the reported discoveries in electric lighting by Mr. Edison, of Menlo Park, might have led one uninitiated in the science of electricity to believe that the electric light was the original invention of that now well-known and ingenious American, and that electricity had scarcely been heard of until the exaggerated stories concerning his inventions were spread about, to the great depreciation in value of the shares of gas companies. But that it was known long before Mr. Edison's inventions excited the commercial and speculative world, is evidenced by the experiments of Sir Humphry Davy, who produced the voltaic arc in 1800, and exhibited it (4 inches long in air and 7 in vacuo) in 1813 at the Royal Institution. In lighting by incandescent lamps, the first patents applied for were by Mr. King, a young American, and Wright, in 1845-6; King's patent was for an incandescent burner of platinum, and Wright employed revolving discs of carbon. About the same time incandescent lamps, with carbon in a vacuum, were used to illuminate a mine; but of course the vacuum was not so perfect as that at present used, because the apparatus for producing it was not so good. Coming down to more recent times we find it was used in some bridging operations on the Danube during the Turco-Russian war.

But notwithstanding the progress made during the last few years in lighting by means of electricity, the rapidity of its progress towards perfection, from the first exhibit of Sir Humphry Davy before the Royal Society, has been very slow when compared with that of lighting by means of coal gas; and notwithstanding this recent progress, it still does not do what was expected of it, and probably will not supersede gas—at any rate, for some years to come. It has, nevertheless, a great and important field before it.

Many misconceived notions have been formed as to the production of the electric light. *It is not produced from electricity.* Scientific writers often speak of the *conversion of electricity* into light, but this is an error. Mr. Sprague says, "we do not burn electricity as we do gas or oil to produce light, and even the gas and oil are not converted into light, but into carbonic acid and water; the source of their light is their potential energy, set free as heat in the action of combustion. The process by which the heat gives light is the raising to white heat of solid particles of carbon, momentarily set free from their combined hydrogen, which is burnt first, those particles, which if the flame is cooled, appear as soot. This may be shown by a Bunsen burner, giving a blue flame, with intense heat and no light, because the mixed air burns the whole of the gas: fine dust of any kind, but especially carbon, as lampblack sprinkled into the flame, at once makes it luminous. The process of generating light is *identical in the tallow candle, the gas flame, the electric arc and the incandescent lamp;* in all of them the light proceeds from intensely heated particles of carbon. It is ENERGY *that is converted into light in all cases.* It is the *cost* of the energy and its *density* in each kind of light which constitute the ratio of economy and efficiency."

This brings us to the two systems of electric lighting; by the *arc* and by *incandescence.* Roughly speaking, every system of electric lighting comprises two parts—a generator and a lamp. Generators have been described under the head of Batteries and Dynamos, and the composition and manufacture of various carbons for electric lamps have been described in Article III., August, 1883; therefore, I shall here confine my remarks to the two systems of electric lamps and their uses.

The present era of electric lighting may be said to date from the discovery of the dynamic system of generation in 1866, by Mr. S. A. Varley, Sir Charles Wheatstone and Dr. Siemens respectively. The Gramme machine or generator was followed by the Siemens, Brush, Edison and a number of others, which differed only in the arrangement of their parts, but acted on the same principle. Indeed, it would be possible to construct from the elements of a Gramme, a Siemens and a Brush machine, nearly every dynamo in the market.

Turning now to the second necessary part of a system of electric illumination—that is the lamps—the arc and the incandescent, we will take the arc lamp first.

If whilst a current of electricity is passing through a rod of carbon the latter is broken in two, and the adjoining ends are very slightly separated, a luminous arc of great brilliancy will extend between the two points, this is called the voltaic arc. During this action the current heats the air and volatilizes a small quantity of the carbon, thus filling the growing interval with a gaseous conductor and producing a light proportioned to the energy transmitted to and expended in this conductor.

The carbons are usually arranged in the lamp with the positive rod uppermost, and this + carbon being the more highly heated by the current, burns away twice as fast as the negative end; as in electrolysis, particles of it are carried off and transferred to the negative carbon which forms a pointed cone below, while the + carbon forms a hollow crater of great brilliancy, and acts as a kind of reflector to throw the light downward.

To maintain uniform illumination some arrangement is required for bringing the carbons nearer together in proportion to their consumption, thus keeping them always at the same distance from each other. Numerous self-adjusting arrangements have been invented, the most important being those of Serrin, Duboscq, Siemens, Carré, Lontin, Rapieff, Brush, &c.

In 1840 the sticks of carbon were pushed forward by hand as they were consumed, but as this was tedious and inconvenient, an attempt was made a little later to render this movement of the carbons automatic by placing the carbon holders under the control of clockwork, or of electro-magnetism. The first lamp of this kind appears to have been invented by Thomas Wright in 1845; in 1848 Staite & Petrie, in England, and Foucault, in France, invented their regulators; these were followed by Serrin and others, and up to the revival of the electric light in 1878, Serrin's lamp was the best and almost only one in use. In this elementary form of regulator the upper carbon slides in a metal clip by its own weight; one side of the clip is connected to the armature of an electro-magnet, which causes a pressure increasing with current, so that when the current is reduced by the growing resistance of the lengthening arc space, the pressure diminishes and the carbon slides down, till the growing current again stops its motion.

The number of inventions in relation to arc and incandescent lamps is so great and increasing that it will be impossible to attempt a description of them; I must, therefore content myself with a brief outline of the principles involved, and a few examples.

Regulators of the arc lamp may be divided into six classes, viz.:—1st, Regulators founded on the attraction of solenoids, and to this class belong the regulators of Archerean, Loiseau, Gaiffe, Jaspar, Carré, and Brush; 2nd, Those founded on the approximation of the carbons by successive movements produced electro-magnetically, and amongst these are Faucault, Duboscq, Deleuil, Serrin, Siemens, Gironard, Lontin, Mersanne, Wallace, Farmer, Rapieff. 3rd, Regulators with circular carbons, of which the most important types are those of Thomas Wright, Lemolt, Harrison and Reynier. 4th, Those with a hydrostatic action, and amongst these are Lacassagne & Thier's, Pascal's, Marçais & Duboscq's, Way's, Molera's, and Cebrian's. 5th, Reaction regulators, such as those of Fernet, Van Malderen, and Bailhache. 6th, Electric candles on Jablochkoff's principle, and others.

The Siemens Lamp.—The current in passing through the carbons of this lamp is diverted through a pair of hollow coils, one of which has a high resistance and serves as a by-path or shunt-circuit to the other. These coils attract soft iron cores connected to the carbon holders, and when the arc becomes too wide the influence of one predominates over the other, and allows the upper carbon to be fed to the lower.

Rapieff Lamp was introduced into the *Times* printing office in 1878, and is said to be still giving satisfaction. It consists of four carbons opposed to each other in pairs, forming a figure X with this difference, that the lower pair is set in a plane at a right angle to the plane of the upper pair. It is regulated by a drop-weight and cords.

Jablochkoff Lamp was introduced in 1878, and used in the streets of Paris, where its success gave a great impulse to electric lighting. The candle consists of a pair of carbons placed side by side instead of in the usual manner, that is, point to point, they are separated from each other by a layer of kaolin or plaster of Paris; the two carbons are connected at the top by a strip of conducting composition of plumbago and gum, through which the current passes on starting the lamp; the current then alternates in each carbon, thus burning them down equally, otherwise if the current were continuous in one direction the positive carbon would be wasted away much faster than the other, and the light fail. In each lamp there are four separate candles, but only one burns at a time, each burning one hour and a half, and when exhausted the commutator automatically turns the current into the next candle, and thus enables the lamp to give six hours of light from the four candles. The plaster of Paris connecting the two candles becomes heated and then acts as a partial conductor, and becomes very luminous; it however causes the intermittent rosy tinge which at intervals flashes into the light. The light from this lamp is more unsteady and less powerful for the energy supplied, than that of an inferior arc lamp. These lamps are stated by some authorities to give a light of 450 candle power in a horizontal line, and this is reduced by the opal globes to 172, and to about 90 on the ground.

The Gulcher Lamp is of great simplicity and ingenuity in its principle of regulation, and may be taken as a type of the best class of arc lamps; it is illustrated in Fig. 71. The upper carbon holder is an iron rod, which can drop by its own weight past the pole of an electro-magnet in circuit with the arc; and whenever the arc becomes too wide and the current weakens in the electro-magnet, the restraining attraction of the magnet, which has hitherto held the rod from dropping, is enfeebled, and the carbon holder slides down, bringing the upper carbon nearer to the arc. Thus the current regains its normal strength, and then the magnet re-asserts its hold on the rod and arrests its descent, until a further adjustment is necessary. The fluctuations of the Gülcher light are very trifling and almost imperceptible. The advantages claimed for the Gülcher system are—the lamps, owing to their simplicity, can be produced cheaply, and any number can be switched out of and into circuit without affecting the rest. The attention required by the lamps or the dynamo is unaccompanied with danger to human life. No matter how many lamps are being maintained, the electro-motive force is never increased beyond a

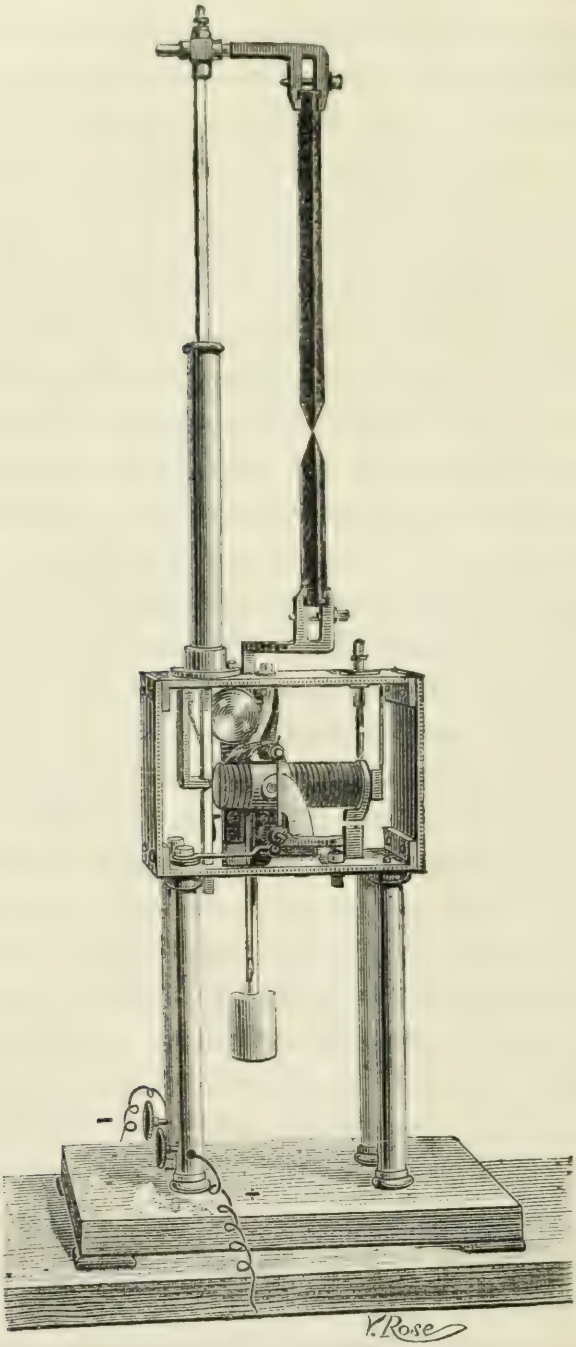

Fig. 71.

very low tension (60 volts.). The system automatically regulates the horse-power required for any number of lamps, the current is continuous, and the insulation of the conducting wires need be but slight compared with cables used for currents of high tension.

Werdermann's Lamp may be classed as a semi-arc—or almost a true incandescent—lamp, and the principle embodied in its construction is important. A block of carbon, in shape resembling an inverted saucer, is placed uppermost, supported on a stand and in connection with the negative wire from the dynamo; beneath is a rod of carbon which is constantly raised upwards against this carbon block by a weight acting through a cord over a pulley. The lamp is of the simplest construction, having neither clockwork or other regulating mechanism. The inventor claims that there is a repulsion between the carbon block and the point of the carbon rod sufficient to cause a slight separation. When the current is passed, the carbon rod, at its upper extremity, becomes incandescent, and glows with a clear, steady light. In a later form of his lamp, Mr. Werdermann has substituted a disc or cylinder of copper for the carbon block. This system is less economical but more steady than the pure arc lamp.

The "Lampe Soleil," or Sun Lamp, is another specimen of the semi-incandescent arc lamp; it may be considered as a combination of the Jablochkoff candle and the oxy-hydrogen system. It consists of two carbon rods, the ends of which rest in a block of limestone or compressed magnesia contained in an iron case open at the bottom. A slip of carbon connects the two ends of the rods, and by means of which the current passes from one rod to the other on starting the light. The current being once started, this carbon disappears, and the limestone or magnesia between the ends of the carbons becomes white hot and emits a steady mellow beam of light of a less violet hue than the pure arc lamp. This is a very suitable lamp for picture galleries, shops, &c.

The production of an electric light satisfactorily for the purposes of house or street illumination requires a minimum electromotive force of 40 to 50 volts., and the Council of the Society of Telegraph Engineers and Electricians have laid down a rule that, to secure persons from danger inside buildings, it is essential so to arrange the conductors and fittings that no one can be exposed to the shocks of alternating currents *exceeding* 60 *volts.*, and that there should never be a difference of potential of more than 200 volts. between any two points in the same room.

The current must be from 5 to 10 or more ampères, and the internal resistance of the battery or generator must be kept very low. The internal resistance of batteries such as the Daniell and Leclanché is too high to render them of use for producing the electric light. A battery of from 40 to 60 Grove's or Bunsen's cells is efficient, but will last only two or three hours; therefore the dynamo-electric machine, worked by a steam-engine, may be considered the only practical generator of currents for electric lighting purposes at present known.

The temperature of the arc varies with the dimensions of the carbons and the E.M.F. of current. Solid bodies become luminous at a temperature of about 1000° Fahr., yielding all the rays of the solar spectrum as the temperature is increased; and at a temperature of 2000° to 3000° Fahr. a rich golden light is obtained. Becquerel states the temperature of the voltaic arc to be 2100° centigrade; and Rosetti, as the results of numerous experiments, gives—

	+ Carbon.	Arc.	– Carbon.
With 80 Bunsen Cells ...	2870	3500	2400 Cent.
Maximum ...	3900	4800	3150 ,,

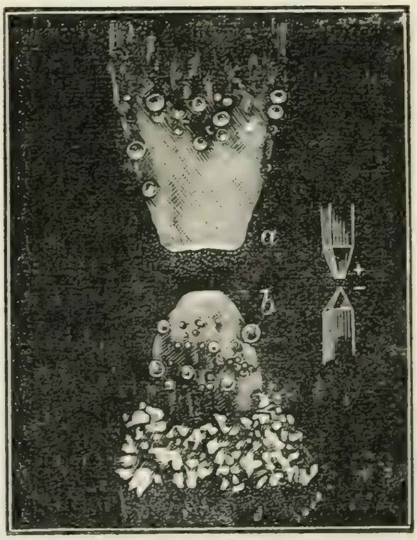

Fig. 72.

The arc is the chemist's most powerful instrument of analysis: it fuses and volatilizes the most refractory minerals, such as platinum and the diamond, and even softens iridium, which, if not pure, may be melted.

The E.M.F. in the arc varies with its length, and Messrs. Ayrton and Perry found that an arc of one-tenth of an inch requires 60 volts., increasing quickly up to a quarter inch, and then at the rate of 54 volts. per inch.

Fig. 72 illustrates the *voltaic arc* as seen through a magnifying lens. The upper carbon is hollowed out in the form of a minute crater, caused by the volatilization of the carbon during the passage of the current from the upper to the lower carbon ; the lower carbon at the same time becomes elevated by the deposition of part of the vapour ; the globules are caused by the silica, iron and sulphur present in the graphite from which the rod is prepared. The carbons at the points of illumination undergo a remarkable change from the intense heat to which they are subjected, and become converted into graphite or black lead ; this is specially the case with the lower or negative point, which then forms an excellent lead pencil. Rods of carbon may be thus formed into graphite throughout their entire length by the powerful heat of the electric current. The upper carbon wastes away with twice the rapidity of the lower ; one of 12 inches in length and $\frac{3}{8}$ inch in diameter will last from about 7 to 9 hours, varying with the strength of the current.

In its applications the arc light is best suited to exterior illumination, such as streets, large open spaces, docks and quay work, fortifications, and as a search-light for torpedo boats in time of war ; it is also useful in factories, where a general illumination is required over a large area, but its *fluctuating character* renders it specially unfit for the house or the reading room, where the constantly changing adjustment of the eye required makes it injurious to the sight. Very powerful arc lights are now produced for lighthouses, &c., of 10,000 to 150,000 candles power. Some American towns, such as St. José, California, are entirely lighted by these powerful lamps, which are placed on tall iron masts, and the light is thrown down by large umbrella-like reflectors. The light at Hell Gate, New York, surmounts a lattice-tower 250 feet high, so that, though thoroughly lighting up the roads, it does not dazzle the eyes of navigators. The illuminating power of this light is equal to that of 54,000 candles, and the current is supplied by a No. 8 Brush dynamo.

Having spoken of the arc and semi-arc lamps, we come now to the third type, viz. :—

The Incandescent Lamp.—In this the light is produced by heating, by means of the electric current, a strip of metal or of carbon to a white heat in a glass globe from which the air has been exhausted.

The form generally given to incandescent lamps is shown in Fig. 73, which is an illustration of the Swan Lamp, and Fig. 74 the lamp holder. The progress in this direction, as already shown, relates to the details and the most effective manner of carrying into practical effect the principles of the electric light rather than to the principles themselves, for, as previously stated, the lighting by *incandescence of carbon in vacuum* was patented by King in 1845, and invented by Star, an American, in association with King. They used the best vacuum then attainable—that produced in a barometer tube—and Mr. Mattieu Williams, also an associate of King's, says, "We had no difficulty in obtaining a splendid and perfectly steady light. We used platinum and alloys of platinum and iridium, and then tried a multitude of forms of carbon, including burnt cane."

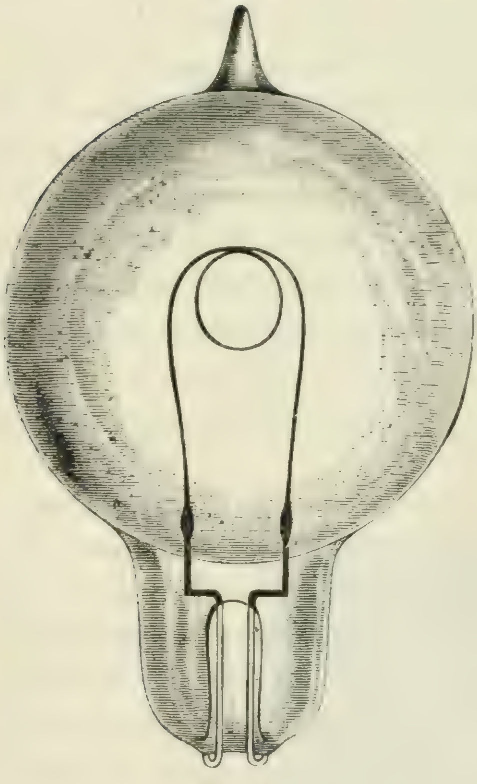

Fig. 73.

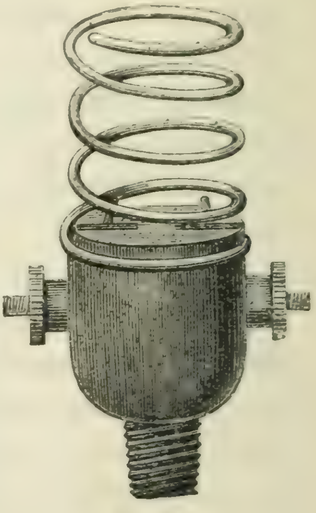

Fig. 74.

In 1838 M. Jobard published his idea of using a small carbon as a conductor of current in a vacuum. These ideas were taken up in 1846 by Greener and Staite, and by Petrie in 1849; and

M. de Changy made effective lamps of this kind, and submitted them to the Academy of Brussels in 1858. Fontaine says, "Illumination by incandescence, and the principle of its production, had long been forgotten, when, in 1873, a Russian physicist, Lodyguine, resuscitated both, and made a small lamp, which was subsequently improved by Konn and Bouliquine." In 1879 Messrs. Edison, of New York, and Swan, of England, made important strides by the introduction of their new and more perfect lamps. Other names, such as Sawyer and Mann, of New York; Lane Fox, Maxim, and Professor Crookes, may be considered to rank next, and nearly parallel, to Swan and Edison in the introduction of incandescent electric lighting. For the composition and process of manufacture of carbon filaments for incandescent lamps I must refer the reader to article III. in the *Dental Record* for August, 1883. Some improvements have been made in their manufacture since then, notably those of Messrs. Woodhouse and Rawson; the Western Company, U.S.; and Mr. Alexander Bernstein, of Boston, Mass.

Messrs. *Woodhouse and Rawson* make their lamps of all sizes and powers suitable for medical, microscopical, and telescopical purposes; also for ordinary and extraordinary lighting. These new lamps are economical users of electrical energy; the efficiency is so high that the current they take is very small; the bulbs, therefore, unlike those of most small lamps, keep so cool that they can be allowed to touch the flesh while surgical operations are being performed.

The *Western Company's* beautiful carbon filament is said to be of exceptional long life; as prepared, it is cut into a wave-like loop, and when made incandescent presents a crimped appearance. It is called "tamidull," or "tamadine," and is prepared from pyroxylin; by treatment with a reducing agent a base is left of homogeneous cellulose, which is carbonized in the usual way.

The Bernstein Lamp gives a light of from 50 to 60 candles as compared with the light of 16 to 20 candles—the average of many other lamps. A hollow carbon cylinder takes the place of the ordinary filament of other lamps, and a larger illuminating surface, but with lower resistance, is thereby obtained. The characteristic novelty of the Bernstein lamp is in the carbon which is made by carbonising a narrow and hollow ribbon of white silk, which is not directly connected to the platinum wires, but by means of a special cement to two copper wires, which are soldered to the ends of the platinum wires.

The efficiency of the Bernstein lamp, as compared with the other incandescent lamps, according to the report of the Scientific Commission of the Vienna Electrical Exhibition, under Professor Dr. Kittler, is as follows :—

Name of Lamp.	Candles per H.P.
Lane-Fox	118
Maxim	152
Edison	163
Swan	190
Bernstein	294

The method by which the incandescent electric lamp acts may be best explained by analogy. A quantity of water flowing through a broad conduit runs quietly and smoothly, without causing any special phenomena ; but if the conduit be narrowed at any given point, the even flow of water changes its character and a rapid is produced ; the contracted channel is no longer able to accommodate the passage of the water in the same easy manner, and the water accumulates at the narrowed point until a pressure is produced that forces it along at an increased speed, and the gentle flow is changed into a rushing seething current, giving evidence of its force by its noise and foam. This illustrates the action of the incandescent lamp. The current of electricity flowing along the copper wires or conductors meets with no appreciable opposition until it reaches the carbon filament of the lamp, where a greatly magnified resistance is offered, and the energy of the electric current expended in overcoming that resistance manifests itself in the form of heat and light.

In a lecture delivered in Newcastle by Mr. Swan, October 20th, 1880, he describes his early experiments in reference to this subject, and states that it had appeared to him for many years that if ever the electric light was to become generally useful, it would most probably be by the incandesence of carbon, and he had long before this rendered the idea practicable. Twenty years previous to the date named, Mr. Swan had a number of pieces of card and paper, of various forms and sizes, buried in charcoal in a crucible. This crucible he sent to be heated white hot in one of the pottery kilns belonging to Mr. Wallace, of Forth Banks. The carbons were in the form of an arch, one inch high and a quarter of an inch wide. The glass globe was exhausted with an air pump, and with a battery of 50 cells he had the pleasure, he states, of seeing his carbonized paper arch become red hot, and that nothing more was wanted than a still stronger current to make it give out a brilliant light. Mr. Swan went on to say that "the discovery of the dynamo machine had entirely altered the position of the question of electric lighting. The Sprengel air-pump, too, had been invented, giving much higher vacua than the old form of air-pump. Mr. Crookes's radiometer experiments had shown us what a really high vacuum was, and how to produce it."

In October, 1877, Mr. Swan sent to Mr. Stearn (whose knowledge of the Sprengel pump was only equalled by that of Mr. Crookes) a number of carbons made from carbonized cardboard, with the request that he would get them mounted for him in glass globes, and then exhaust the air as completely as possible. In order to produce a good vacuum, Mr. Swan found that it was necessary to heat the carbon to a very high degree *during the process of exhaustion*, so as to expel the air occluded by the carbon in the cold state.

It will be seen from the foregoing remarks, that as a matter of history, neither Mr. Swan nor Mr. Edison were the original inventors of the use of carbon in a vacuum for electric lighting. They used a finer thread of carbon and obtained a more perfect vacuum than previous experimenters, but their real improvements consist mainly in their methods of producing their carbon filament, and in the details of the construction of the lamp itself. But from these early experiments of Mr. Swan his modern and very beautiful incandescent lamp, illustrated in Figs. 73 and 74, has grown to its present state of perfection.

(To be continued.)

BIOLOGICAL STUDIES ON THE FUNGI OF THE HUMAN MOUTH.[*]

By Prof. W. D. Miller, D.D.S., Berlin.

In order to be able to determine upon the proper course to be taken in the attempt to remove or check the progress of any disease, it is necessary that our ideas of the cause and course of that affection be established upon the most certain, exact and scientific data which we are capable of attaining. Unfortunately for the Dental profession, the attempt to furnish a scientific solution of the problems of Dental caries has, until recently, been confined to a very few, and even now a majority of the investigators in Dental pathology are content to restrict their observations to the clinical aspect of the question, a course which could never produce a satisfactory solution; while others even openly advocate a speculative course, and do not hesitate to ascribe to every new factor discovered in nature, a role in the production of caries of the teeth.

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[*] German mycologists use the term 'Pilz' indiscriminately to designate either Schizomycetes, Blastomycetes, Hyphomycetes or Myxomycetes. When it is desirable to refer to any one of these groups in particular, they use the prefixes Spalt, Spross, Schimmel or Faden, and Schleim, giving Spaltpilz, Sprosspilz, Schimmel-or Fadenpilz and Schleimpilz. Following their example, I have in previous papers used the term fungus for all of the four groups of mycetes mentioned above, and shall also use the term in this paper, in which only Schizomycetes are treated of.

Consequently we have had presented to us, in turn, worms, acids, inflammation, electricity, infusoria, bacteria, putrefaction, toxic, agents, etc., etc., as causes or conditions of *caries dentium*, some of these theories containing some truth, and some a surprising amount of absurdity. In the last two or three years, however, a great advance has been made in the methods of study, and a number of important points have been firmly established.

1.—The observation of Leber and Rottenstein that microorganisms are constantly present in decaying dentine, has been confirmed. (Weil, Milles, Underwood, Miller).

2.—The softening of dentine in caries has been shown to be chemically identical with that produced by certain weak organic acids. (Miller, Jeserich, Bennefeld).

3.—It has been established that various organisms found in the human mouth, produce the decalcifying acid by first converting nonfermentable sugars into fermentable varieties, and secondly, by splitting fermentable sugars into lactic acid. (Miller, Hueppe).

4.—The same organisms have been found capable of dissolving decalcified dentine, while they have no apparent effect, even after two or three years, on sound dentine. (Miller).

5.—Caries of dentine, chemically and morphologically identical with natural caries, has been produced outside of the mouth (Miller).

6.—It has been furthermore shown that certain of the organisms of the human mouth are capable of developing under exclusion of air, thus making it possible for them to propagate within the substance of the dentine. (Miller, Hueppe).

I propose to describe, in this and the following article, a series of experiments made for the purpose of obtaining more definite information respecting the number and morphology of the fungi of the human mouth, and their physiology, as far as is necessary to an understanding of the part which they may perform in the production of caries of the human teeth.

At the meeting of the American Dental Association, at Saratoga, a number of tubes containing pure cultures of fungi were passed around ; with regard to these a reporter remarked that "they were evidently beyond the information of the majority." It is not very flattering to American dentistry if its representative Association allows a question of so great importance to remain beyond its comprehension, nor is there any excuse for such a condition of things now, so widespread have the methods of pure culture become. I rather incline to the opinion that the reporter misinterpreted the apathy of the members of the Society. I shall, at any rate, here describe in a few words the methods now universally employed in isolating any given fungus, and then, more in detail, give the means which I have used to ascertain the physiological characteristics of the different fungi when obtained in pure culture.

We will start with a solution densely impregnated with micro-organisms, and a number of tubes of culture gelatine, perfectly sterilized. The gelatine being melted, we add to the first tube one bead (on a loop of sterilized platinum wire) of the solution. This is called the *first dilution*. From this tube we add two or three beads to a second tube (*second dilution*), and from the second, five or six beads to a third tube (*third dilution*). The gelatine is then poured upon horizontally placed, sterilized, cold glass plates. It congeals in a few seconds, and the three plates are placed in a pile (on glass benches) in a moist cell. The plates are examined after twenty-four to thirty-six hours, under a magnification of one hundred diameters.

By this means the fungi are so separated that on the third plate there will generally not be more than two to ten ; (on the second there may be one hundred or two hundred, while on the first, of course, there are very many more). As each micro-organism develops, being fixed in the gelatine, we will have at that point a pure culture of that particular kind. At another point we obtain a colony of a second kind, and so on. In general, colonies of diffierent fungi may be distinguished with the greatest ease, by their microscopic appearance. With a sterilized platinum wire, bent at right angles at the end, we now pick up a number of the colonies of each kind, under the microscope (one hundred diameters) and transfer them directly to tubes of culture gelatine, only one colony to each tube. We have then (except in case of a possible accidental air-infection) pure cultures. Some experience is necessary to enable one to pick up the colonies under the microscope. Beginners should not attempt it with plates where more than one colony is in the field at once.

The method described in this journal (page 340, 1884), also reprinted in the *Dental Record*, vol. iv., page 434, may also sometimes be used to great advantage. For fungi which do not grow on gelatine, Agar-Agar, or congealed blood serum, should be used. The former, one to one and a half per cent., has a higher melting point than gelatine, ten per cent., and remains solid at the temperature of the human blood. When it is used for plate-cultures, it must be melted in hot water, and the infection made at a temperature of 40° to 42° C. Below this temperature it becomes solid, and cannot be poured; above it the germs would be liable to suffer. In other respects the Agar-Agar media are treated as the gelatine. Congealed blood serum cannot, of course, be poured upon plates. It is prepared in test tubes so inclined as to give the greatest possible surface, and a minimum quantity of the substance containing the fungus or fungi spread over the surface. Having obtained a pure culture of any fungus, the points to be determined regarding it are the following:

1.—Its morphology; (bacillus, spirillum, micrococcus).

2.—Is it movable? Does it produce spores?

3.—What are its growth-characteristics on various media, microscopically, and to the naked eye?

4.—What are its relations to oxygen?

5.—Does it produce fermentation? If so, what fermentation, under what conditions, and with or without development of gas?

6.—Does it cause putrefaction?

7.—Does it have a diastatic, inverting, or peptonizing action?

8.—Has it a pathogenic character?

9.—Does it produce coloring matter?

10.—What is its susceptibility to the action of the various antisceptics?

The first and second of these questions are, of course, determined by the microscope alone; the third, by the microscope and the naked eye combined; the fourth, by the methods described in this journal, page 62, 1884, or by placing a thin strip of mica upon one half of the culture-plate before the gelatine solidifies; the mica then adapts itself closely to the surface of the gelatine, excluding the air, and if the fungus requires oxygen for its development the colonies beneath the mica either will not developed at all, or they will be very small compared with those on the other half of the plate, their growth ceasing as soon as the oxygen in the gelatine has been consumed. (Koch). The fifth point is answered by infecting fermentable solutions with the fungus in question, placing it under various conditions of temperature, etc., and determining the products of fermentation (if any); the sixth, by analogous methods; the seventh question is determined by the action of the fungi upon starch, cane sugar and albumen (boiled white of egg); the eighth by experiments on animals; the ninth by the appearance or non-appearance of color in the vegetation itself, or in the surrounding medium; the tenth by experiments that will readily suggest themselves.

Other points to be investigated will be mentioned further on. Boiled potato is a medium of great value in the determination of Schizomycetes. No medium, however, requires greater care in preparation and after treatment than this, in order to obtain satisfactory results. Any sound potato *which does not become mealy or crack open on boiling*, will do for the purpose; it is first thoroughly washed and brushed, and all defective spots and deep eyes being removed, it is placed for one hour in a corrosive sublimate solution, five to one thousand, then in the steam sterilizer, for one-half to one hour. In the mean time the moist cell is sterilized, and the bottom lined with filter paper wet with sublimate solution, five to one thousand. The potatoes are, while hot, removed from the sterilizer with sterilized forceps, cut into halves with a cold sterilized knife, and placed directly upon the sublimate paper (the cut surface up), and the cell closed. Potato sections prepared in this way should remain unchanged indefinitely. When the potato has become cool, the cover of the cell is carefully removed, and the fungus which is to be cultivated is spread upon a space about as large as a dime, in the centre of the section. Fungi which, morphologically as well as in their reaction upon gelatine, Agar-Agar and blood serum, show no appreciable differences, may sometimes be easily distinguished by aid of the potato culture. The potato can seldom be used to separate fungi (*i.e.* to prepare pure culture). It is chiefly used as a reagent in distinguishing between fungi already in pure culture.

For example, all comma bacilli yet discovered grow on potato, except the one found by Dencke in old cheese, which does not develop at all on potato, and is thereby at once distinguished as an entirely different fungus.

Eggs may often be used to great advantage. They are prepared as follows. The *fresh* egg is placed in sublimate, five to one thousand, for ten minutes, then in the steam sterilizer for one hour. The cell for eggs is prepared as for potatoes, except that a sterilized glass plate, resting on a glass bench, is placed in the bottom to support the egg sections. As the eggs must be handled with the fingers, the hands must be thoroughly washed, then soaked in sublimate, five to one thousand, and then washed again in *alcohol absolutus*, to remove the sublimate. The eggs are shelled while still hot, and cut into two, three or four sections. They are vaccinated in points upon the white ; the yellow is not so well adapted to culture experiments, since it cannot be cut with a smooth surface.

I always keep on hand sections of potato and egg, also tubes of gelatine, Agar-Agar, and blood serum, and when in my practice particularly good material, or anything uncommon presents itself, a portion of it is at once transferred to these different culture media, so that it is pretty sure to develop in one of them, at least. For example, I have several times met with a fungus in the human mouth, which produces a yellowish coloring matter, and which absolutely refuses to grow on anything which I have tried, except potato.—*Independent Practitioner.*

NUTRITION IN EARLY LIFE AS AFFECTING THE TEETH.

A Paper read at the Annual Meeting of the Midland Branch of the British Dental Association, held at Nottingham on April 17th, and published in the "Journal" of the Association.

By Lewis W. Marshall, M.D., Surgeon to the Children's Hospital, Nottingham.

I have to thank you, gentlemen, for the honour conferred upon me by your society in asking me, as a representative of the Medical Profession, to address you to-day. It is with great pleasure but with extreme hesitation that I do so. It is my object to show that we who are engaged in a more general and comprehensive view of the human frame, recognise how necessary it is that some explanation and remedy should be offered for and against the undeniable increase in tooth-decay. It is not likely that I can offer to you such an explanation or remedy, or that I can add anything to the great work already done by those who have paid special attention to this subject. I may, however, be able to turn the attention of those present to-day to a line of thought which appears to me, after somewhat limited enquiry, to have been imperfectly followed out.

Dental caries, I am thankful to see, has recently come before the Poor Law Authorities, at least in one district, and a new departure has been made by the appointment of a surgeon-dentist to the workhouse school in that district. His duty will be to correct the hitherto routine practice of unlimited and early extraction. We medical men know full well how necessary this step is. Ill-health—the result of imperfect assimilatiom—and consequent inability to do the work which might lift the individual from his humble position, is the inevitable termination to such neglect and error in practice. To you, as dentists, this new field for observation cannot but fail to give, as hospital work does to us, a larger area for enquiry. By this means it is possible much light may be thrown on the subject now under consideration, because this practice will be amongst those who are the offspring of the poorly nourished, and who have themselves suffered both in their embryonic and separate existence, from equally unhealthy surroundings. I heartily hope that this new field may be productive of much good work, and that it may prove so, it is, in my opinion, essential that there should be a cordial co-operation between the dentist and the doctor.

In preparing this paper, I have read through several papers written by members of your own body, and some by members cf my own profession, and I have been struck with the marvellous difference in the opinions as to the chief causes of dental caries. The remedies suggested are multifarious. One writer—Mr. Sewill, deals with the question in a comprehensive way, and appears to me to shew much more clearly than do other writers the direction in which elucidation of this mystery is likely to be effected. He insists upon accuracy as to facts, and a true appreciation of the general causes calculated to affect this destruction. Quoting from his paper, I find he says; "Never before was the public health so well cared for, and never was there such comparative freedom from most diseases which leave their mark on the constitution of the victim, and lead to degeneracy in his descendants. Of living races, the British is the most exuberantly fertile. The higher classes, although luxurious are not enervated." I should be disposed to question whether diseases that "leave their mark on the constitution of the victim" are less common. Indeed I should say, that tuberculosis and syphilis are more so. The former is produced by the higher pressure which increased civilisation saddles on the rising generation; and the latter is more rapidly diffused by the greater facilities with which large towns are approached by outlying districts. I question also the statement that "the higher classes . . . . . are not enervated."

All classes live faster, and the battle for life is harder. These factors lead to rapid waste in our nerve power. In both sexes this waste is met with; markedly so by comparison with past generations of women in the upper classes. Mr. Sewill, in speaking of the people in the United States, refers to the "insanitary lives led by ladies." Are we so free in this respect? I am disposed to think not; and the fact of the imperfect way in which the average English lady suckles her offspring, even when desirous to do so, is, I think, evidence not entirely to be set aside. So much for the parents. Of the children the same writer says: "At no previous period were the children of the well-to-do classes in highly civilised states on the whole so well housed, or cared for hygienically, as at the present day." Whilst admitting the statement as to habitation and clothing, I speak with grave doubt as to the hygienic care of the offspring. The propensity to hand over the child at an early date to the feeding bottle, with its multitudinous contents, is steadily on the increase. It may appear somewhat irrelevant for me to criticise so freely the words of one writer; but as before stated by me, Mr. Sewill's papers take a wider grasp of this subject than any of those which I have seen. I am therefore naturally led to accept his arguments and statements as those of your profession. Before dealing with the question of the child, it is very necessary to consider those factors which may have influenced the developmental process prior to birth. For this reason I have felt it very necessary to insist upon my opinions expressed above. The fact of the teeth being far advanced in development during intra-uterine life makes it certain that organic deterioration of enamel must be accounted for by some process which is in action before the child is born.

Of the various causes assigned by writers for the production of caries, hereditary tendency is insisted upon as one which aids much.

I recognise fully the power which transmitted diseases—such as gout, syphilis, &c.,—possess, but I am disposed to think that these causes are often placed too prominently forward by your profession.

The want of care, and the ignorance displayed by the mother in the management of her own health during the time of pregnancy, are probably no unimportant agents. Let these agents be added to the "enervation" which may exist on either side, and we may fairly calculate on a weakly progeny.

The imperfect measures adopted for the future well-being of the child supply one thing needed to complete the unnatural process.

It is now generally admitted, I believe, that deterioration of enamel is actually taking place, although writers differ on this point. When present, however, the decay of the teeth must necessarily be much more easily accomplished, because this destructive action always begins on the surface of a tooth. Even healthy enamel will not withstand the several acids which may be brought to bear upon it later in life.

Before leaving this subject, I would mention an observation which I have made in my out-patient practice. In the same badly-nourished child there is to the eye a wide difference in appearance between the enamel of the two upper central incisors and their opponents in the lower jaw. These teeth amongst the temporary set are always the first to decay. A reason, I know, is assigned for this in the fact that the alkaline saliva protects the lower teeth from the injurious effects of buccal secretions which have become acid. If my observation is correct, this reason does not explain the whole matter. Why should this difference exist between two sets of teeth developed at or about the same period of uterine gestation, and presenting themselves in the mouth in succession to the other set? I can offer no explanation for what I consider to be a fact. With thus calling attention in a general way to the things which may be considered if dental caries is to be explained, I would pass on to the more specific part of my subject, viz.—the nutrition of the offspring.

This subject is one in which I take a deep interest, and I am disposed to think that on this side of the question comes much which will tend to throw light upon the matter. I have before referred to Mr. Sewill's statement that the children of the present day are better cared for than were those of previous times, and at the same time pointed out the imperfect manner in which the natural food is secreted, or, if secreted freely, imperfectly given to the child. When mothers' milk is used, amongst all classes of society, but much more so amongst the upper and middle classes, it is used in a half-hearted way. Convenience is pleaded as the chief excuse for not carrying out Nature's plan. But, for the sake of convenience and economy, the lower classes find it wiser to use their own secretions. The half-hearted way referred to is this: A mother, who has, perhaps, a plentiful supply of her own milk, finds it more in accord with her wishes to give some mixture of cow's milk, or, very commonly, Swiss milk, because at an early age this preparation leads to less immediate ill effects; if not either of these, she will do worse still, and give one of the many malted, or unmalted, farinaceous foods. Many children who are the offspring of strong parents, appear to go through their infant life with comparative health and happiness, the other health factors being sound; "fat and fit for a Baby Show," as the expression is. Such a child may be liable to occasional bronchitic attacks and diarrhœa, which the mother thinks are the necessary sequence of advancing teething; the teeth being delayed, or, as is not uncommon, cut very early. This is a hasty sketch of a child so reared. The inevitable result of this system is that the general plan of development is upset, and the child apparently healthy and thriving is in fact rachitic. It may never pass on to the advanced stage of bone-distortion, recognised as rickets by the public, but the malnutrition and disordered development, with the various digestive troubles, exist. The above description calls attention to one of the many errors in rearing babies, and that is the early use of some food to supplement the mother's milk, the least injurious being cow's milk. The chief error, I may say in passing, in the use of this product, lies in the way in which dilution is practised and the mode of preparation of the meals. Some boil their milk, others do not. Some give half milk and half water during the first month, or even week, of life, others give a preparation of less strength. The careful adjustment of a cow's milk diet, either to be used in conjunction with mother's milk or alone, is in reality a matter which hinges upon the true appreciation of the general principles of hand-rearing of infants; and nothing, in my judgment, requires greater skill or acumen in nursing—using the word in its broadest sense—than does this. Each child has to be dealt with as a separate case, to which general rules alone can apply; differences in detail must necessarily arise. This is directly opposed to the general idea that the experience of one mother is of value to a second in the matter of feeding, even though both use the same food. To return to the subject of this paragraph—another error is—and this is more commonly found amongst the poor—that mothers suckle their children too long. Human milk, in common with cow's milk, reaches its highest point of nutritive value at or about the third or fourth month, and it remains more or less stationary in the healthy woman up to the ninth month. After this period it deteriorates, both in quality and quantity. The quantity may be maintained by the use of malted liquors, although the nutritive value is probably never increased by such means. To suckle a baby up to the twelfth month is very common, and in my out-patient practice I even find cases of suckling being continued up to the eighteenth month, or second year. How under these circumstances a healthy child is expected to be reared, it is difficult to say.

Now to deal with the hand-rearing of children from the date of birth. Usually the first month is the time when, under the most careful management, troubles and discomforts will arise. That period when the machinery is called upon to act alone, and to become educated into that harmonious action which is called health, is devoted to the trial of numberless preparations only too commonly farinaceous, and harm is done which will take endless time and care to undo. It is during the first and second months that the groundwork is made for subsequent digestive troubles, and the inevitable failure of all organs in the carrying out of their functions. This leads me up to a point of special interest to those whom I am addressing. In these digestive disorders lies the clue to much of the tooth destruction which is found. The ill effects of error, even at this early date, are not easily set aside, and, although to a limited degree, are more or less present even up to and after the term of infancy has expired: I mean the second year. Evidence of this want of attention to the general rules which should guide us may be found even up to the age of puberty, and therefore after the age at which the second dentition begins. As a result of this casual and haphazard system of feeding, the bones of the face suffer, in common with all the components of the body. The rachitic face, or, as we know it at the Children's Hospital, the "starchy baby," is easily picked out. The teeth are found small in size, crowded or irregularly placed; serrated on their margins, and bad in colour. All these children are specially liable to constantly recurring stomatitis, and when not present in this pronounced form, we find the sweet-smelling breath with red tip to the tongue, which points to rapidly changing secretions in the mouth. No care appears to be thought necessary to protect the teeth from the destructive power of such secretions. During the period of suckling, or even, I will say, the first year, the child's mouth may be looked after; but even this is done in a perfunctory manner;—"Washed out night and morning," the nurse says. Is this sufficient to counteract the damaging tendencies of the agents which are present in the mouth? I think not. When the child is launched into its second year, even this imperfect precaution is relinquished, and the teeth look after themselves until the age of school life, when the dignity of a tooth brush is usually conferred.

I am in the habit of insisting upon the use of some agent to protect the teeth during these earlier years, such as salicylate of soda or baracic acid.

Previous writers and readers of papers for your society, those at least amongst my profession, as well as many amongst your own, have urged the use of certain foods which may appear to possess chemically the agents needed for the production of bone and therefore teeth. You will gather from what I have said that this choice in foods appears to me to be very secondary.

It is, I think, quite a delusion to use phosphates, whether as a food or medicine, in the hope that the enamel may be made more enduring, which enamel is developed antecedent to the birth of the child. What is really required, even were it possible to modify the enamel in that way, is to regulate, and to restore to health those organs which, if I may so express it, are all awry, and unequal to the assimilation of such matters. In these cases of rachitis and mal-nutrition, the urine is more commonly than not found to abound in phosphates, and an alkaline urine is no uncommon cause of enuresis which, however produced, frequently exists in rachitic children. Nature is actually throwing out what it appears to be so necessary she should conserve and utilise. This appears to me to point strongly to the general conclusion that I have now arrived at, and one which I offer to your society for what it is worth. That the malnutrition caused by ignorance and non-attention to the general rules which guide those of us engaged more especially in children's work, is answerable for a vast amount of the destruction in teeth. It would be foreign, I think, to the object of your society for me to do more than refer in general terms to the measures which are considered necessary for the maintenance of that perfect state of health which alone can give us what we mutually seek for.

Before all things it seems to me needful that our girls should be educated on a physical basis, which shall ensure a standard of health fitting them to become mothers. Upon such health rests the physical and mental condition of future generations. Whilst not being in the least desirous of underrating the value of mental attainments, I am fully impressed with the need for modification in the physical training of girls, which is only too commonly neglected. With this training must come an improved power of supplying the natural food to the offspring, and let us hope the mental culture will also show the moral obligation under which the mother is placed to her child.

Whatever means are employed in rearing children, certain general rules must be observed. That which is probably most neglected is the time for giving meals. A fixed and definite period of time must be set down for each meal, and the interval be rigidly maintained in accordance with age. Sleep, during the daytime, is no excuse for irregularity in this particular. It is as easy to educate a child in good ways as in bad ones ; and by determination at first, a child may be regulated as an alarum clock to wake up at the times fixed for feeding. Simple though this matter may seem, much hangs upon it, and much discomfort and dyspepsia is due to its non-observance.

Besides regularity, the quantity and quality of the foods employed must be considered. In quantity I find no sort of definite idea is arrived at by the average nurse. She fills her bottle and allows the child to take what it can. The child being very commonly ill-fed, both as to time and food, is "greedy" and takes more than it ought. There is a distinct quantity which will be tolerated by the average child at different ages, and it is unwise to give more.

Of the character of the food I am induced to speak more freely.

Milk in some form is the only food which should be used at an early age, and cow's milk I prefer to any other, because according to the analysis given in Pavy's work on Foods, cow's milk "most closely approximates to that of woman, but it is rather more highly charged with each kind of solid constituent." Asses' milk and mare's milk are easily digested by children on account of their deficiency in nitrogenous matter and butter, and from the fact that they contain a large amount of lactine. Condensed milk of any brand is equally well digested. Fat and apparently healthy children are reared on it. It is much in favour with nurses because it is so well tolerated, but as shewn in a paper in the *Lancet* of November, 1872, the bulk of the child is only due to fat, and a time soon comes when the want of the solids declares itself. The chief objection to cow's milk, viz.: the preponderance of casein and the dense curd formed, has been most ably met and overcome by a suggestion of Frankland. By preparing the milk in a certain way, he has enabled us to get rid of the curd, and at the same time retain the valuable qualities of the milk. I am in the habit of using two forms of "Frankland's milk." The weaker kind being diluted with half whey; the stronger having one-third dilution only. To these is generally added the cream from ½-pint of milk. I use at an early age the weaker preparation diluted with water, and subsequently add cream, so that the proportion of fat and salts is largely increased. Where cell growth is going on rapidly there we need fat. Cream is the most suitable means by which to give this. The nutritive value of the food is increased by the addition of cream, and the ease with which the milk is digested is not so readily interfered with.

Milk in some form I say is the best and only food which should be used up to the sixth month. After that date, some one of the good malted foods (Mellin's by preference) may be taken. Thin broth and beef tea being added to the dietary at, or about, the eighth month, with rusks and the yolk of egg about the eleventh month. Chapman's Food—which contains the phosphates—may be advantageously given at the tenth or eleventh month. After the first year, the diet of a healthy child becomes comparatively simple. I am disposed to think that the value of the farinacea is overrated, and that their abuse is very frequently answerable for the digestive troubles so often met with, even at so late a period as the sixteenth month. Even up to the second year, milk and cream must be our sheet-anchor, if a healthy child is to be reared; and the child that takes most of these in the twenty-four hours will thrive best.

As stated at the outset, gentlemen, I have endeavoured to direct your thoughts into a channel which may help somewhat towards the prevention of dental caries. I can only hope that my remarks may prove of some value to my hearers. My desire has been to shew that the frequent attempt to correct the destructive process we are considering by a selection of foods alone is insufficient, and that if this matter is to be improved, we must deal with it on a larger basis, and consider first, the mother and her offspring as one; secondly, the offspring.

The latter part of my paper has been devoted to pointing out briefly, the gross errors which exist, and are daily in action in the rearing of children. The troubles which arise as a result of these errors can be avoided, and to this unhealthy method of living, I believe, is to be attributed in some measure, imperfect tooth formation and early decay.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting of this Society was held on May 4th, Mr. Richard White, L.D.S.Eng., Vice-President in the Chair.

Mr. E. Lloyd Williams exhibited a model of the upper jaw of a lady, aged sixty, showing a large mass of hypertrophied gum tissue attached to the palate by a large flat pedicle. The occurrence of such growths in connection with the wearing of plates was not uncommon, and this one was remarkable only on account of its size. The patient had worn a plate, retained by springs, for fifteen years.

Mr. Charters White remarked that such growths were often met with in patients who had been wearing for some time a misfitting plate. In this case the edge of the plate had evidently cut into and irritated the mucous membrane of the palate. He thought the best plan would be to make a plate to cover the whole of the palate, the pressure of which would soon cause the disappearance of the mass.

Mr. Browne-Mason (Exeter) exhibited models of the mouth of a girl, aged eleven, showing a remarkable malformation of the jaws. The upper jaw receded so that the incisors closed a quarter of an inch within the lower, and the only teeth which articulated properly were the first permanent molars on the right side. He should be very glad to receive any suggestions as to treatment, though he feared the case was incurable.

He also handed round a model which he had received from Mr. Parkinson, of Bath, showing unusually large and well-formed supernumerary laterals.

Mr. W. A. Hunt (Yeovil) read the following notes of an instructive case of neuralgia coincident with the advent of the wisdom teeth :—

" A lady vocalist, some three years ago, suffered greatly from ordinary neuralgic pains on the right side of the head, affecting all three divisions of the fifth nerve, with pain apparently located in the first right lower molar. An irregular practitioner extracted this tooth, which he said was sound, but the patient experienced little benefit. Under the hands of her medical attendant, after a six months' course of quinine, &c., the pain did, however, slowly abate, but only to return as badly as ever on the *left* side.

" She then consulted me, but, she said, with little hope of obtaining relief. Her age was twenty-eight, and her general appearance healthy, but the pain made her miserable. Her teeth were all well formed and regular, but seemed firmly compressed against each other. The right lower wisdom tooth only had been erupted, and on this side the first lower permanent molar had been extracted, as already mentioned.

" The advancing wisdom tooth must, I thought, have been the cause of her pain, and had the second molar been extracted instead of the first, relief would have followed almost at once, instead of taking nearly six months, and the expenditure of so much medical skill and quinine. I therefore examined the left side carefully, and by passing a fine probe through a little dimple in the gum, I felt the wisdom tooth beneath. I at once removed the second molar under gas ; some relief was at once experienced. I advised her to discontinue all medical treatment, and in two or three days the pain entirely subsided.

"A year elapsed, and she again consulted me with the same kind of symptoms on the *right* side. Here I could see a presenting cusp of the upper wisdom tooth. I extracted the second molar and relief again followed.

"In six months' time she again presented herself with the same typical pain on the *left* side, but more severe than ever. The most careful and prolonged examination failed to disclose the slightest sign of the advent of a wisdom tooth, or even of its existence; yet from former experience, I, without hesitation, extracted the second molar under gas, and I have here the tooth for your inspection. The specimen clearly shows the injury done by the advancing, though buried, tooth; the distal half of the posterior buccal root and some of the crown have disappeared, and the nerve canal is completely exposed for more than half the length of the root. It was impossible to diagnose this till after the extraction. The operation was followed by immediate relief, and the patient is now absolutely free from neuralgia.

"I may observe that no signs of local inflammation or irritation were discoverable from first to last in this case. The treatment adopted of extracting a useful second molar instead of digging out the less useful third molar was, I believe, correct in this case. All four wisdom teeth were large, well-developed healthy teeth, and eventually took up excellent and useful positions.

"The case is instructive, as its history is so definite and complete, and strickingly illustrates cause and effect no less than four consecutive times in the same individual; and lastly, as illustrating the serious and unsuspected damage that a buried tooth can inflict by pressure against the roots of a neighbour which stands in the way of its progress."

The Chairman said Mr. Hunt's case, or rather series of cases, was exceedingly interesting. He thought that trouble of this sort from the wisdom teeth was more common than it was generally considered to be. At all events, he met with such cases pretty frequently in his own practice, and had almost come to look upon wisdom teeth as natural enemies, to be got rid of whenever an opportunity offered. Recently his son, Mr. Wentworth White, had asked his advice with regard to a gentleman, aged forty, who had for some time been suffering severely from neuralgia affecting the left side of the face. He had consulted another practitioner, who had extracted the second upper bicuspid, which was found to be sound, and this gave no relief. Mr. White could find nothing wrong with the teeth on that side in the lower jaw, but on carefully testing the upper teeth, the second molar was found to be sensitive, and it was decided to extract it. It was then found that the pressure of the wisdom tooth had made a cavity on the distal surface. The patient obtained immediate relief.

Mr. J. S. Turner thought that most of those present must be familiar with such cases. The wisdom tooth, however, was not the only tooth which was capable of causing mischief of this sort. At the March meeting, Mr. White showed a lateral which had undergone very extensive absorption, owing to the pressure of a neighbouring tooth, and quite recently he had himself removed a lateral in exactly the same condition, absorption having taken place to such an extent as to expose the pulp cavity, due to the pressure of the canine, which was coming down in front of it. A remarkable feature of the case was that the patient, a youth, said it had not caused him any inconvenience.

Mr. C. J. B. Wallis showed the skull of a Zulu; a very fine hippopotamus skull; the jaws of a sword fish (also a very fine specimen); and the jaws of a large extinct animal, which he believed to have been an icthyosaurus, and had been dug up in Egypt.

Mr. Hutchinson remarked that the hippopotamus skull was a magnificent specimen, and begged Mr. Wallis to use his influence with the owner to induce him to present it to the Society. The skull then in the Museum was not nearly such a fine one.

Mr. D. Hepburn showed a model of the mouth and jaws of a young man, aged twenty-three, who had been treated at St. George's Hospital thirteen years ago for "fever." He had at the same time some necrosis of the jaw, and extensive sloughing of the soft parts. Cicatrization eventually took place, but accompanied by anchylosis of the lower jaw. The jaw was now practically immovable; he had not the slightest power of mastication, and only a very small aperture between the teeth on the left side of the mouth. Contraction seemed to be still going on, for the upper teeth were being slowly forced outwards. In spite of his inability to masticate, the patient enjoyed very good health, and Mr. Hepburn did not feel justified in advising any operative interference at present.

Mr. R. H. Woodhouse showed a model of the upper jaw of a man, aged thirty-four, which had been sent to him by Dr. Walker. At the age of ten the right permanent central was broken at the cervical line by a blow from a stone. Abscess ensued, and the root was extracted three or four months after the accident. Three years ago, seventeen years after the accident, the right permanent canine showed signs of eruption. The permanent right lateral and temporary canine were firmly articulated.

He also handed round a model of the upper jaw of a young man, aged seventeen, which had been sent as a donation to the Museum by Mr. Adams Parker, of Birmingham. His first dentition was perfectly natural. With the second dentition a supernumerary tooth appeared to the right of the middle line; this became loose and was extracted, when a second supernumerary tooth appeared in the same position. It was firmly implanted and quite sound.

The Chairman then called upon Dr. St. George Elliott for his communication on "Bridge-work."

Dr. Elliott said the subject of his communication was one which had not as yet been often discussed at meetings like the present. Indeed it was comparatively a new subject. For although bridge-work was not actually a new invention—he had himself seen fifteen years ago a good example of this kind of work in the mouth of a patient, and it had been in use fifteen years at the time he saw it—yet it was only during the last five or six years that it had come into anything like common use in the profession. Like other methods it might be carried to an extreme, and used without judgment in cases where a plate would have answered much better; still it was very useful in suitable cases. Patients were sometimes met with who had a very strong objection to wearing a plate. Singers, for instance, found a plate very inconvenient; very nervous and irritable patients also not unfrequently objected to them. In such cases "Bridging" often afforded a satisfactory means of remedying defects.

It was sometimes asserted that bridge-work was likely to cause trouble, and do harm to the teeth which served as supports, owing to the difficulty of preventing accumulation of food about the parts; but this was a mistake. The work might and ought to be done in such a manner that no inconvenience whatever should arise from this cause, and perfect cleanliness could be maintained by the patient with less trouble than where a plate was worn.

He had prepared some diagrams which would illustrate some of the conditions under which this method of treatment might be beneficial. The first case he would mention was that of a German baron, who was first treated on this plan about five years ago by a dentist at Dresden. In this case the right upper lateral and canine had been fastened to the first bicuspid and central. The bar was attached at one end to the lingual aspect of the central by a gutta-percha filling, and was anchored at the other end to the bicuspid by a gold filling. It was evident that a considerable strain fell upon the central, and it might have been supposed that the gutta-percha stopping would have given way, but it did not. The work lasted two years, and then the lateral broke off from the bar. The patient came to Dr. Elliott in order to have the breakage repaired; he expressed himself as highly satisfied with what had been done, declaring that he had never had any comfort from artificial teeth until he had this bridge in place of a plate which he had previously been wearing. Dr. Elliott removed the piece with some difficulty, replaced the lateral, and refastened it as before to the central, only using gold instead of gutta-percha. This time it only lasted six months, when the central, to which the bar was attached, broke off. Dr. Elliott then cut down the stump of the central to the level of the gum, and attached to it a porcelain crown with a gold backing by means of a screw pin and nut. One end of the bridge was then soldered to the gold backing, and the other carried to the bicuspid and securely anchored to it by amalgam. This had lasted well, and had given great satisfaction to the patient.

Some amount of judgment and experience was required in adapting this method to particular cases. As an illustration of this he would mention a case which had come under his notice. The patient had lost his right upper lateral, and to replace it the dentist had devitalized the canine and inserted a platinum wire in the nerve canal. This wire, after being anchored by gutta-percha, was bent at right angles, and had a lateral soldered to it. No protection was given to the canine other than that afforded by the gutta-percha, so that the tooth soon decayed and gave way, the bar bent under the strain of mastication, and the lateral was forced up into the gum. Dr. Elliott removed the appliance, cut down the canine to near the gum, and fitted on a gold-backed plate tooth, with a hole through the gold for the passage of a screw which was anchored in the stump by amalgam. The lateral was soldered to the pivot thus made, and on the mesial side of the lateral a pin was soldered which passed into a small cavity already existing in the central, where it was secured by a filling. Subsequent experience proved the value of having the bridge detachable, for after the appliance had been worn for some months the pin in the central gave way ; the bridge was then quickly removed by unscrewing the nut, a new pin soldered on, and the apparatus replaced.

Dr. Elliott considered that the attachment of an artificial crown by means of a screw and nut was decidedly the best mode of pivoting for these cases, on account of its being easily detachable in case of accident. This was almost impossible when bridge-work was attached to crowns fitted on the Richmond principle. He found also that it was very difficult to prevent food and mucus accumulating under the overlapping edges of these crowns and leading to bad results. His experience of this method of pivoting dated back some five or six years, the results at first being most discouraging. These failures taught him that in order to obtain satisfactory results he must make his own screws. He found that when he used those sold by the depôts the nuts came unscrewed and the crowns came off, frequently in two or three weeks. The screws must be much finer than those usually sold, and the nuts must be conical and cut half through, so as to make them self-locking. He found also that aluminium bronze or German silver were better materials for the screws than platinum, since they became slightly oxidized, and thus held more securely.

Dr. G. Field said he had not used bridge-work very extensively, but he found that in exceptional cases it answered admirably, and he used it under favourable conditions with great satisfaction to himself and to his patients. He had, of course, met with failures, but these had not been sufficient to discourage him, or to induce him to give up the method. He preferred the Richmond crown, or the Webb flat pivot tooth with gold backing, to the use of screws and nuts. In some cases he anchored the ends of the bar into adjoining natural teeth by means of gold fillings. The fillings would break away occasionally, this could not altogether be prevented, but as a rule they lasted very well. In one case where this happened, the patient being unwilling to submit to having another gold filling inserted, he filled with osteo ; and although the filling had required attention from time to time to repair the effects of surface disintegration, it had lasted very well. He did not approve, as a rule, of the plan of bridging over four or five teeth, and had only seen one case in which this had been satisfactorily accomplished. The objection on the score of uncleanliness was entirely theoretical; the bridge could always be made of such a form as to be easily kept clean.

Dr. A. S. Richmond said the subject under discussion, crown and bridge-work, was one to which he had given some attention, and which interested him greatly. Dr. W. M. Morison, of St. Louis, the inventor of the Morison chair and engine, was, he believed, the first to make gold crowns encircling the roots of molar and bicuspid teeth; this was in 1868. In 1876, Dr. Cassius M. Richmond, who was then practising at San Francisco, produced the "Richmond crown." This was a porcelain, or porcelain-faced, crown attached to the natural root by a pin or tube, the attachment being strengthened by a gold band encircling the root. This method was still employed by the best operators throughout the world, and had never been improved upon since.

With regard to bridge-work he would hand round some models of cases which had been under his own care, showing various adaptations of the method. He had a piece of bridge-work in his own mouth which was put in in 1876, and which had therefore stood the test of nine years' wear. In 1878, he had a case in which a loose and decayed lateral adjoined a sound and healthy central. After trying various experiments with the lateral, he extracted it and attached a lateral crown to the central and canine: the work had stood well up to the present time. Early in 1880 he pivoted a first molar with a Morison gold crown and the canine on the same side with a porcelain-faced crown, connecting them by a bridge carrying the two bicuspids; this also was still in use. These cases might serve to show the lasting character of the work. There was no difficulty whatever in keeping it clean, the teeth being supported clear of the gum, and the whole fitted as it should be in a proper workmanlike manner.

Dr. W. Mitchell said he had had a case to deal with that day in which he had been obliged to modify the ordinary Richmond method. He had occasion to remove a Bonwill crown, but found the pin so firmly fixed in the root by amalgam that he found it impossible to remove it. He therefore cut it off even with the gum margin, and then with a fine fissure burr removed the amalgam all round it to the thickness of about two lines, and to the depth of about a quarter of an inch. He then made the band as usual, soldered on the top, and made a platina tube to fit the pin. He then cut away a portion of the top, placed the band and tube in position, and waxed them together in the mouth. They were then removed in their proper relation for soldering, after which he replaced them and fitted the tooth in the ordinary way. Then, after waxing together and investing in sand and plaster, the soldering was completed and the work was polished and inserted in the mouth, where it fitted perfectly. He thought this plan was really an improvement on the usual method, for the tube added stiffness to the structure, making it much firmer than where the ordinary pin alone was used. Where amalgam was used for setting the pin, of course platina both for pin and tube was indispensable, but he did not see why a good strong cement could not be used with advantage.

Mr. J. S. Turner said that whilst he could not help admiring the ingenuity displayed in these methods of pivoting and bridgework, he was rather at a loss to know what was gained by all this elaboration. The results might be perfectly satisfactory in a certain number of cases, but it must be remembered that operators did not always know of their own failures. When patients were dissatisfied with what had been done for them by one practitioner, they were apt to go to another. He had lately come across a patient who had had five front teeth pivoted sixteen years ago, viz., two centrals, a lateral, and two canines, and they were still firm and useful. The pivoting was done in the old-fashioned way: the roots were cut down and polished, a pin inserted in the canal, and a model taken, then a tube tooth was fitted, first on the model and then to the root, a little floss silk being wound round the pin before it is forced into the root. The plan of pivoting with nuts and screws might sometimes be useful, but he thought that the insertion of the screw and tightening the nut must be a more unpleasant process than fitting a pin into the canal in the old way. He had seen many cases when with Mr. Cartwright of teeth which were shed in the ordinary course of nature with pivot-crowns attached which had been in use for a great number of years, and others must have frequently met with similar cases. Seeing then that the results of the old method were generally so satisfactory, he failed to see the advantage of these later and more elaborate methods.

Mr. R. H. Woodhouse said he had lately removed a pivoted tooth which had been in use for twenty-three years; the crown was quite firm, but the root was absorbed. He thought this was a triumph for the old method.

The Chairman said he had personally no experience of bridge-work, and he was disposed to agree with Mr. Turner that there was no great necessity for the use of screws and nuts. He had been in practice a good many years, and he thoroughly agreed with what Mr. Turner had said as to the good results obtained by the old method of pivoting stumps with natural teeth. The pin was made of *hard* gold; a little floss silk was wound round it, it was then moistened with mastic varnish, and forced well up the canal. Teeth pivoted in this way lasted from twelve to thirty years, and the pin never came out—no one ever thought of its doing so. He felt bound to admit, however, that he had not been quite so successful with mineral teeth. He would now call upon Dr. Elliott to reply.

Dr. Elliott said he had himself used the old method of pivoting, but he wished to advance with the times. The weak point of the method described by Mr. Turner was that the front edge of the tooth resting on the front of the stump gave a considerable amount of leverage, and as the result of any strain on the tooth the pivot was sometimes pulled out. Thus a patient of his who had a tooth pivoted in this way lost one crown and bent another. Another objection was that the pin would sometimes stop short in the canal, and use what force you might you could not get the crown close up to the stump.

In his lectures at the National Dental Hospital, he had been in the habit of describing sixty different methods of pivoting, but he only used two in his own practice, viz., the one he had already described and the Flagg process. This latter method he considered a very good one, and quite as simple as the older method; but though one of the best for front teeth it was not as well adapted to bicuspids as the other. A plain plate tooth was soldered to a pin; this was passed up the nerve canal and packed all about with amalgam. He had brought his drawer of pivoting instruments with him in case any of the members present might like to look over them.

The Chairman thanked Dr. Elliott, in the name of the Society, for his interesting communication, and also Messrs. Hunt, Lloyd Williams, Browne-Mason, Boyd Wallis, and other contributors of specimens and casual communications.

The Society then adjourned.

THE GENERAL MEDICAL COUNCIL.

During the recent Session of the General Medical Council, which lasted eleven days, there was little business transacted that was of special interest to the Dental profession. The programme of business contained only a communication from the British Dental Association regarding the removal of a name from the Dentists' Register, and a letter from the University of Pennsylvania, asking the Council to recognise the Dental degree of that institution. Upon the latter question no resolution was passed.

Respecting the first named item the Council resolved to erase from the Dentists' Register the name of Charles Rudolph Werner, he having been convicted and sentenced to six months' imprisonment in Edinburgh last December.

PASS LIST.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.

During the April sittings of the Examiners the following gentlemen passed the First Professional Examination for the Licence in Dental Surgery:—Edward Percy Rose, Leicester; David Thomson, Edinburgh, and John Trude Fripp, London; and the following gentlemen passed the Final Examination, and were admitted L.D.S.Edin.:—William Wilson, Edinburgh; James Leslie Fraser, Inverness; James Johnstone, Nottingham; Aitken W. Cormack, Edinburgh; Benjamin John Douthwaite, London, and Leonard Latham Wilde, Winchester.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The following gentlemen passed the First Examination for the Licence in Dental Surgery, on 23rd April:—Mr. Ed. J. Hordern, Birmingham; Mr. Frederick Dule, Sheffield; Mr. W. B. Tolputt, Sheffield. The following passed the Final Examination, and were admitted Licentiates on 25th April:—Mr. Leonard Herbert, West Kensington; Mr. Fredk. J. McCulloch, Glasgow. Two candidates were referred at the First and one at the Second Examination.

CORRESPONDENCE.

NOTTINGHAM MEETING.

To the Editor of the DENTAL RECORD.

SIR,—In the issue of the *Dental Record* for this month I am reported as saying, at the Midland Branch Meeting of the Dental Association at Nottingham, that I held "local" influences as those having most control over Dental formation and decay. What I advanced was that "constitutional" conditions, both of the mother and child, exercised most influence in these respects.

I am also reported as stating "That it had been admitted by the Colleges that proceedings could not be taken against those who advertised, nor could they be deprived of their diplomas." This does not exactly convey the import of what I said, which was to the effect, that procedure of the kind might under certain circumstances open up some difficult questions; and that in cases of the kind the Colleges, before withdrawing a diploma, would in all probability avail themselves of the power given to the General Medical Council to pronounce upon unprofessional conduct, and to order the erasure of a name from the Register. The decision and subsequent action of the Medical Council in such cases being final, the Colleges would in this way, where there was any dubiety, be acting more judiciously and equally to the purpose than they would by taking the law exclusively into their own hands. There is no doubt, however, that the Colleges *do possess* the right, if they see fit to censure a Licentiate, or suspend, or recall his diploma, and declare it to be void.—I am, yours very truly,

J. SMITH, Pres. Br. Dent. Assoc.

11, Wemyss Place, Edinburgh, May 12th, 1885.

"CROWN, BAR, AND BRIDGE-WORK."

To the Editor of the DENTAL RECORD.

SIR,—London has recently been flooded with a book, accompanied by a letter addressed to the Medical profession, on "Crown, Bar, and Bridge-work," written by Messrs. Clifford or Clifford Eskell, in which they profess to "explain a system of preserving decayed, and supplying artificial, teeth, which has been for some years in use most successfully in America, *but has hitherto not been introduced into England.*" I quote from the work, the italics are mine. If this quotation gives the honest opinion of Messrs. Clifford, I fear their professional education has been sadly neglected, for this kind of work was introduced at least 14 years ago to my certain knowledge—how long before this I am unable to say—both here and on the continent, *and was found wanting.* That this system of applying artificial teeth may, when used with judgment and skill, prove useful and perhaps justifiable in some very few and very rare cases goes without saying; but that it should be applied broadcast in the manner advocated by Messrs. Clifford, I, for one, must respectfully beg to differ, and in this I think I shall be supported by the majority of our leading Dental Surgeons who have had any experience in this kind of work. And I am more than ever of this opinion since I heard Dr. Elliott, who is an accomplished and skilful operator in all branches of his profession, read his paper on this subject last month before the Odontological Society, and from which I judged him to be but a half-hearted advocate of the system.

My experience of "Bridge-work" leads me to believe that none of the advantages claimed for it exist that cannot be met by more than a corresponding number of disadvantages—plus the greatly increased expense of such work. The two and only advantages that one can honestly claim for it in my humble opinion are—1st, the absence of the plate usually employed as a base for artificial teeth, and which when first inserted in the mouth, so many of our patients declare that they can never do *with*, and a few weeks later declare they can never do *without*; 2nd—the fact of its being permanently (?) fixed in the mouth, its liability to drop at awkward moments is greatly reduced *so long as the hold-fasts remain sound.*

Amongst its disadvantages may be named—1st, the increased expense of such work over that employed in the ordinary method of applying artificial teeth; 2nd—the difficulty and expense of repairing such cases in the event of fracture of any of the teeth, as the gold or other filling employed to hold the case *in situ* has to be drilled out and the whole arrangement removed before it can be remedied, and then there is the tedious operation of refilling; 3rd—the principle upon which perfectly sound teeth are often drilled into and otherwise injured in order to obtain an anchorage for bar or bridge is decidedly bad and unsound; 4—the manner in which the bridge is fixed to the natural teeth is contrary to theory and practice, and this is particularly the case in such instances where a bridge extends from the molar or bicuspid around a corner of the mouth to the central teeth, for then the least absorption of the gums removes the base upon which the case obtained some support, and thus a very powerful leverage is created which during mastication exerts a baneful and irritating influence upon the teeth to which the case is fixed, causing an irritation in them which is extremely annoying and painful to bear, besides loosening those teeth which previously may have been perfectly firm; 5—the great difficulty of keeping such a denture perfectly clean and wholesome in the mouth, for however much we may endeavour to impress upon our patients the importance of keeping their denture well and intelligently brushed they will fail, nearly one and all to do so, and the result is that in course of time the food becomes caked and decomposed upon the base and other inaccessible portions of the denture, forming a nest of sickly and offensive odours. It is true this fault may be mitigated by careful brushing and by the use of antiseptic and disinfectant mouth washes, but I repeat patients will not, or, at any rate do not, in the majority of cases, carry this system of cleanliness to the necessary extent. Every Dental Surgeon is aware of this difficulty, for he meets with it too frequently in his daily practice, even with patients whose dentures can be removed from the mouth with the greatest facility. There is yet another fault in certain forms of this system which may be mentioned, I refer to that of placing a gold cap at one end of the bridge, usually the posterior, which is made to pass over and cover the whole crown of a perfectly healthy tooth, the points of the cusps being removed to prevent the gold cap interfering with the bite ; the result is that in course of time the saliva impregnated with particles of food becomes drawn up by capillary attraction between the cap and the tooth, and thus acts as a permanent destructive poultice to the enamel, sometimes producing intense sensitiveness in the tooth. This trouble may be prevented for a time by applying to the tooth, before placing the cap over it, a solution of gutta percha or other cement, but this in course of time will pass away under the destructive influence of the oral secretions.

It is now fourteen years since I first saw a case of "Bridge-work" when practising in the South of France. It was that of a French lady, the wife of a Government official, who had been for some time under medical treatment for an offensive odour of the breath, but failure of the treatment led the medical attendant to suggest that she should consult a Dental Surgeon, as it had occurred to him that the teeth might have something to do with the trouble. Acting upon this advice the patient consulted me upon the point, and upon examination of the mouth I found what I at once stated to be undoubtedly the cause of the unpleasant odour of the breath—namely, a piece of "Bridge-work." This partial denture had been made by a French dentist in Paris some two years previously, and the case so far as it went was faultless as regards workmanship, it was indeed the neatest piece of work of the kind I had seen. It consisted of a narrow strip of gold plate, carrying the upper left lateral, canine, and two bicuspids, with a pin of gold at each end let into the natural teeth, and then fixed with amalgam in the molar and gutta-percha in the central. In course of time the gum had somewhat absorbed, and the fillings had become loosened so that the case became slightly movable ; and, owing to this and the absorption of the gum, a space was created sufficient to allow of food and other decomposable matter to accumulate and become caked on the base of the plate, thus giving rise to the unpleasant odour complained of. I removed the denture without any great difficulty, and replaced it with a suitable gold plate made in the ordinary way. This answered satisfactorily to my patient and myself, with the assurance that the denture could be removed from the mouth for purposes of cleanliness with the greatest facility.

I have made two or three similiar cases, experimentally, since that time, and my experience with these and others which have come under my notice in this country, on the Continent, and in America, has led me to condemn the system as decidedly one of the most unsatisfactory methods of affixing artificial teeth in the mouth. Some short time ago another case of bridge work came under my notice. It consisted of a lower second tube molar let on to a pin soldered to a narrow strip of gold, which extended up each side of the tube molar, and to which two holdfasts were soldered and let into cavities specially drilled for the purpose in the adjoining natural teeth, and there held by gold foil packed around them. For this the patient had paid fifteen guineas. I considered fifteen shillings too much, so far as the ultimate practical value of this tooth to the patient was concerned. When any hard substance, such as a small fruit seed, got underneath the base of the tooth, it was at times very difficult to remove, and consequently became a source of great annoyance and irritation to the patient. Had the tooth been made removable this unpleasant difficulty would at least have been avoided.

I am, &c.,

C. J. BOYD WALLIS.

LIVERPOOL DENTAL HOSPITAL.

To the Editor of the DENTAL RECORD.

SIR,—In your journal of this month you insert a letter from "One of the late Staff of the Liverpool Dental Hospital," and also make a few editorial remarks thereon. We all know there are two sides to every question, and that when personal feeling is imported, a jaundiced view is very likely to be taken of the subject. May I be permitted to give my version of the affair? Last year, a vacancy having occurred upon the Honorary Staff, applications for the post were sent in. I proposed a gentleman of superior education, ability and legal qualifications, he was seconded by another Member of the Committee. One of the Dental Staff proposed another gentleman, who also was seconded, and in order to prevent any friction or unpleasantness I withdrew my nomination upon receiving an assurance that on the next vacancy my nominee should receive the Committee's support. This was promised, and an entry to that effect made in the minutes. Not long after, Assistant-Honorary Officers were required and advertised for. When the election took place, the gentleman whom I had previously proposed having again applied, received an appointment along with three others, the latter of whom were all proposed by Dental Staff Officers. The *casus belli* on the part of the Staff appears to be that they arrogate to themselves the sole power of electing to any vacancies which may arise from time to time, and refusing any applicants whom they do not think fit to patronise. This is, in my opinion, an improper position for them to assume. Certainly, should they be able to bring any valid charge against the character of a gentleman applicant, either as to morals, qualifications or improper ethical behaviour, then the Committee ought to support them, and not force into the Staff an objectionable party ; but so long as they are not able to cast a single aspersion, nor advance any valid reasons for their opposition, then I unhesitatingly say that the Committee have a just right in exercising their legitimate powers of election, and the minority ought to give way, and graciously accept the decision. Your correspondent says that it is the "principle they wish to uphold." Again, that " they had sent a letter tendering their resignations unless the *obnoxious* party was removed." No comment upon this is required.

If any insult has been given, it is that from the Dental Staff to the Committee, from the Chairman downwards, who, having unanimously elected a gentleman in every way suitable for the post, they (the Staff) chose to resign without giving any reasons which could commend themselves to average intelligent or business-like minds. Your correspondent hopes that he may be assisted to a satisfactory settlement of the difficulty. I think the matter is very easy. Let no future nominations for election of officers take place without the Committee proper and the Staff meeting together and discussing the merits or demerits of the applicants. This, I think, would ensure harmony of action, and prevent such a scandal from again taking place, or producing ill-feeling between two bodies who hitherto have worked harmoniously together. There is not any necessity for me to refer to your editorial remarks, with which all must agree, than to say that the hospital is going on as usual, the poor not being neglected. In fact the attendance of patients is continually increasing, and that the authorities of the Liverpool Dental Hospital have not lost any time in endeavouring to satisfactorily settle the present difficulty.—I am, Sir, yours obediently,

Liverpool, May, 1885. R. H. D. JOHNSON.

OBITUARY.

WE regret to announce the death, on the 18th ult., of Mr. William Routledge, of Westmorland Road, Newcastle, aged 54. He was a member of the British Dental Association, and had for some years suffered from disease of the heart.

MR. JOHN J. ANDREW, L.D.S.Eng., has been appointed Dental Surgeon to the Belfast Hospital for Sick Children.

Editorial.

THE LEGAL POWER OF THE COLLEGES.

THE letter by Dr. John Smith, published on page 282, happily corrects an error in our report of his speech at the meeting of the Midland Branch of the British Dental Association. There is clearly not simply a moral obligation to his College on the part of the Licentiate in Dental Surgery who has signed the prescribed declaration. Though it has been definitely asserted by persons in authority that such was the nature of the pledge, it is satisfactory to learn that the conditions under which the degree has been granted are backed by legal powers. Unfortunately this is not the case with the L.D.S.Eng. "There is no doubt, however," writes Dr. Smith, "that the Colleges *do possess* the right, if they see fit, to censure a Licentiate, or suspend, or recall his diploma, and declare it to be void."

The Licensing Bodies being armed with such powers to maintain their dignity and honour, should be ready to exercise the same whenever necessity requires. The letter published at page 523 of Vol. IV. of the *Dental Record,* is but one expression of many similar opinions. The advertising columns of the London daily papers constantly give ample evidence of culpable offence against the honour and dignity of one of the Royal Colleges of Surgeons, and on the part of that College a breach of faith with its Licentiates in Dental Surgery.

This question of the power of the Licensing Bodies has been written upon at different times, and it has been discussed even more frequently. It is referred to again because of the existing abuse, and also to give additional prominence to the statement of the President of the Royal College of Surgeons of Edinburgh.

GOSSIP.

Subscriptions are being raised to restore the tower of Hempstead Church, which fell nearly three years ago and reduced the building to a ruin. Within its walls the immortal Harvey lies entombed. Sir Henry Pitman, of the College of Physicians, is acting as Treasurer to the Committee.

The Teeth in Morphiomania.—As the result of a careful investigation, the *Lancet* says, M. Combes has arrived at the conclusion that the chronic ingestion of morphia leads to rapid decay of the teeth. The disease appears first in the enamel of the teeth, and the large molars are the first to be affected; the small molars are next diseased; then the incisors suffer, and last of all the canines. As the enamel is insensitive, and as there is no periostitis, the disease makes rapid progress without causing much pain. The effect of morphia on the sensory nerves should also be borne in mind. The hair falls off at the same time that the teeth decay in morphiomaniacs.

The curious phenomenon of red hail was observed in county Down on May 7th. During the shower about one in a hundred were of a decided red colour, the rest being white. The colour was not merely superficial, but pervaded the substance of the hail stones, which on melting in the hand stained the skin.

Monthly Statement of operations performed at the two Dental Hospitals in London, from April 1st to April 30th, 1885:—

		National.	London.
Number of Patients attended		1,565	—
Extractions	Children under 14	312	453
	Adults	448	847
	Under Nitrous Oxide	554	540
Gold Stoppings		95	213
Other Stoppings		577	592
Advice and Scaling		200	148
Irregularities of the Teeth		197	124
Miscellaneous		123	292
Total		2,506	3,209

THE
DENTAL RECORD.

VOL. V. JULY 1, 1885. No. 7.

ON THE AVAILABILITY OF CERTAIN ANTISEPTICS IN THE PROPHYLACTIC TREATMENT OF THE ORAL CAVITY.

By Prof. W. B. MILLER, A.B., D.D.S.Berlin.

IN the *Independent Practitioner* (page 283—1884), and *Dental Record* (page 341—1884), I published a table giving the results of a series of experiments on the antiseptic action of a considerable number of medicaments used in the treatment of the oral cavity. A few new materials have since been added, and I here produce the complete table.

Antiseptic.	Concentration necessary to prevent development of micro-organisms.
Bichloride of Mercury	1 — 100,000
Nitrate of Silver	1 — 50,000
Peroxide of Hydrogen*	1 — 8000
Iodine	1 — 6000
Iodoform	1 — 5000
Naphthaline	1 — 4000
Salicylic Acid (Crystals)*	1 — 2000
Benzoic Acid*	1 — 1500
Permanganate of Potash	1 — 1000
Eucalyptus Oil	1 — 600
Carbolic Acid	1 — 500
Hydrochloric Acid	1 — 500
Biborate of Soda*	1 — 350
Arsenious Acid*	1 — 250
Chloride of Zinc	1 — 250
Lactic Acid	1 — 125
Carbonate of Sodium	1 — 100
Listerine*	1 — 20
Alcohol	1 — 10
Chlorate of Potash*	1 — 8

Those substances designated by a * were tested upon a pure culture of one of the most common ferment organisms of the mouth, the others were tested upon mixtures. In the majority of cases a stronger solution will be necessary to sterilise (or prevent development in) a mixture than a pure culture, and where solid substances are present, as in the saliva (particles of food, &c.), the fungi resist still longer the action of the antiseptic.

It must furthermore be readily apparent to every one that the real value of these materials must not be set down as proportional to the numbers in the table above. To say that the bichloride of mercury is, for dental uses, 200 times as valuable as carbolic acid would be as little admissible as to say that dynamite is, in proportion to its greater power, more valuable for industrial purposes than horses.

The question of the availability of different forms of energy, which has long been one of greatest interest to physicists, merits also in the study of antiseptics a thorough consideration. A partial solution of this question I have endeavoured to present in the following notes. I have employed in each case the highest concentration that may be readily used in the human mouth as a wash or on the brush.

The substances tested will be found in the following table:—

The 1 per cent. solutions of benzoic and salicylic acids (in 20 per cent. alcohol) are rather too sharp to be ordinarily used in rinsing the mouth, especially the latter solution; they may, however, be applied on the brush. The same is true of listerine.

Since, in rinsing the mouth, one does not keep the liquid in contact with the teeth longer than a minute, we need as an antiseptic mouthwash a substance which is capable of devitalizing the micro-organisms of the oral cavity in one minute or less. In my experiments for determining such substances, I have used the following method. I first prepared a tube containing a pure culture of one of the more important fungi of the human mouth, we may call this the *infecting tube;* second, a tube containing 0·5 c.c. of the antiseptic to be tested, we will call this the *antiseptic tube;* and third a number of tubes containing 5·0 c.c. of culture liquid or culture gelatine, these we will call the *culture tubes*.

A small drop or bead is conveyed from the infecting tube to the antiseptic tube on a loop of fine platinum wire, and then at intervals, varying from ¼ min. to 15 min., beads are conveyed from the antiseptic tube to each of the culture tubes in succession, one bead to each tube. These tubes are then kept at the temperature of the oral cavity. If the fungi were *all* devitalized by their passage through the antiseptic, the culture tubes remain clear, otherwise they become cloudy in a period varying from 7 to 60 hours.

These experiments should be doubly controlled: 1st, two culture tubes should be infected, using only sterilised water in the antiseptic tube; these two tubes should become cloudy in seven to ten hours, and if either of the other tubes become cloudy in the same time, it indicates that the antiseptic through which the fungi were passed had no effect whatever upon them.

The retardation in the appearance of the cloudiness will give a measure of the action of the antiseptic in those cases where a complete sterilisation was not effected. Second, the experiment should be repeated, using only sterilised water in both the infecting and antiseptic tubes. In this case the culture tubes should remain indefinitely clear. Should they become cloudy, it would indicate clumsy work on the part of the experimenter, and his experiments would be worthless. It is advisable to sterilise the air of the room before performing these experiments.

The results will be seen in the adjoined table:—

Antiseptic.	Time of Exposure necessary for Sterilisation.
Salicylic Acid, 1—100	¼ min.
Benzoic Acid, 1—100	¼ ,,
Listerine	¼—½ min.
Salicylic Acid, 1—200	½ ,,
Bichloride of Mercury, 1—2500	½—¾ ,,
Benzoic Acid, 1—200	1—2 ,,
Bichloride of Mercury, 1—5000	2—5 ,,
Peroxide of Hydrogen, 10 per cent.	10—15 ,,
Carbolic Acid, 1—100	10—15 ,,
Oil of Peppermint (In agreeable strength for Wash.)	10—15 ,,
Permanganate of Potash, 1—4000	over 15 ,,
Boracic Acid, 1—50	,, 15 ,,
Oil of Wintergreen (in agreeable strength)	,, 15 ,,

It will be seen at a glance that of the substances tested in this series, only four are available for the prophylactic treatment of the human mouth. These are bichloride of mercury, salicylic acid benzoic acid and listerine. Of these four I think the bichloride is without doubt the most effective, because its action continues longer.

In the attempt to sterilise the oral cavity a very serious difficulty is encountered in the fact that the antiseptic cannot in many cases be brought into contact with all portions of it. The free surfaces may become sterilised, but portions less exposed, especially the approximal surfaces of the teeth, fissures, cavities of decay, &c., escape the action of the antiseptic unless it may be kept for some length of time in the mouth. It is here that the bichloride of mercury (1 to 2500) possesses a decided advantage; after the body of the liquid has been put out of the mouth, the traces remaining continue their action until they have become diluted 120 times, this substance, in the proportion of 1 to 300,000, still having a retarding action upon the development of fungi. It appears also to be more penetrating than either of the other three available antiseptics. Unfortunately, however, it possesses one great disadvantage—its highly poisonous character. It seems, however, scarcely possible that any harm can result from its use in so dilute a form. The maximal dose of corrosive sublimate *pro die* is 0·1, and if we suppose that each time the mouth is washed with the 1 to 2500 solution (once daily), 0·5 c.c. of the solution gets into the system (a very high estimate), then it would be 500 days before the amount which may be administered in one day would be reached.

As just remarked, the possibility of any bad result seems almost excluded, and yet the element of certainty is lacking, and though I use the solution myself continually, often as strong as 1 to 1000, I hesitate to recommend it to my patients.

Considering the great interest which this question must possess for every dentist at least, I would recommend members of the profession to test the matter by experiments upon themselves and report the result. In no other way can a satisfactory solution of the question be arrived at. For self-experimentation I would advise the use of a solution of strength 1 to 1000, with sufficient oil of wintergreen to disguise the taste. It has, furthermore, been claimed that a solution of bichloride of mercury corrodes the teeth; this, however, needs confirmation.

As to salicylic acid, some say that it decalcifies the teeth, others deny that it has any effect of that kind. Buch (*Journal of Mat. Med.*, 1880), after having used a solution of salicylic acid, in strength 3 to 1000, for some weeks was obliged to discontinue its use, because he noticed "a curious feeling in his mouth, the teeth became softer, and their surfaces rough, through the formation of salicylate of lime." On the other hand, a chemist in Berlin has used a much stronger solution for over 10 years. His teeth when he began were in a deplorable state, but in a short time he succeeded in permanently arresting the progress of caries, of which there is now not a trace in his mouth, while the old cavities are brown and hard. No evidence whatever of any deleterious action upon the teeth can be seen. It seems, however, fully well established that salicylic acid is a substance which must be used in the mouth with great caution, to say the least.

The somewhat weaker benzoic acid might be substituted for salicylic, provided it also should not prove to have an injurious effect upon the teeth.

Particularly noteworthy is the rapidity with which listerine acts. It appears to be one of the strongest and safest of the available antiseptic solutions. It owes its efficiency in all probability more to the borobenzoic acid which it contains than to the eucalyptus.

In comparing the two tables given above we notice what appears to be very great contradictions. Why does the peroxide of hydrogen, which in one series stands very high, fall so low in the other? and why should listerine, which is 40 times weaker than a 10 per cent. solution of peroxide of hydrogen, effect a sterilisation 30 times quicker? I can account for this striking difference only on the supposition that the rapidity with which a given antiseptic acts is by no means necessarily proportional to its ultimate strength. It is necessary first of all that the antiseptic pass through the cell membrane before it can act upon the protoplasm of the organism. This passage seems to take place very quickly in case of some substances, and comparatively slowly in case of others, although the latter, once through, may act more powerfully than the former. We must also bear in mind that the materials in the proportions given in the first table only prevent the development of the fungi, while by the proportions in the second the complete devitalization is accomplished. There is a very great difference between the two. Many substances and conditions prevent by their mere presence the development of fungi without in the least rendering them incapable of development when they are brought into the proper medium. We need, of course, for most dental uses substances which produce complete sterilisation in a short time of contact.

It is furthermore an important fact that the substance which it is wished to sterilise may so act upon the antiseptic as to materially lessen or destroy its power. In this respect the permanganate of potash is very sensitive. Some antiseptics are liable to lose in strength with time. A preparation of peroxide of hydrogen from the best source in Berlin lost one-third in two months. I was particularly surprised and disappointed in the results obtained with this substance. I hoped to find in it a more effective and available antiseptic than any which we now possess, but in this I was completely deceived, its slowness of action unfitting it almost altogether for dental uses. It may act more quickly upon putrefactive organisms. This question I will determine by further experiments.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. Boyd Wallis, L.D.S.Eng., &c.

(Continued from page 257).

In the year 1845 Draper had endeavoured to produce a satisfactory light from the incandescence of platinum wire rolled into a spiral form, and in 1858 De Changy made a similar attempt; and Edison more recently took up the idea which, with the reputation he had gained by his invention of the phonograph, made a great noise in the newspapers, sufficient to considerably lower the shares of gas companies and cause serious financial disasters. The principle of the improved Edison lamp which caused this flutter in financial and scientific circles was the incandescence of a spiral of platinum wire alloyed with iridium, and according to a later patent this spiral was covered with a metallic oxide, either of cerium, zirconium, calcium, magnesium, or other metal, and this covering was termed *pyro-insulation.* But notwithstanding the assertion that the long-sought solution of the problem of the division of the electric light had been found, the means for the production of a successful incandescent lamp were still wanting. However, Edison continued his researches and experiments, which finally resulted in the production of the beautiful lamp which until recently illuminated the Holborn Viaduct.

The carbon of the Edison lamp is made from selected bamboo, cut to the required size with enlarged ends for junction to the platinum conductors; this junction is also electro-coppered.

The *Lane Fox* carbon is of horse-shoe shape, made from the fibre of an Italian grass, which is heated to incandescence in a carbon vapour, in order to increase its density and adjust its resistance to the required point. The platinum wire from this filament ends in a small tube containing mercury, into which the copper terminals also dip.

Prof. W. Crookes, F.R.S., perfects his carbon by acting on it with chlorine and other agents, to dissolve or vaporize impurities; and three great requisites for the successful production of an incandescent lamp are obtained in this, viz.:—

1st. Perfection of the vacuum, which Mr. Crookes has taught us how to procure.

2nd. Purity and density of the carbon filament.

3rd. Cheapness and facility of manufacture.

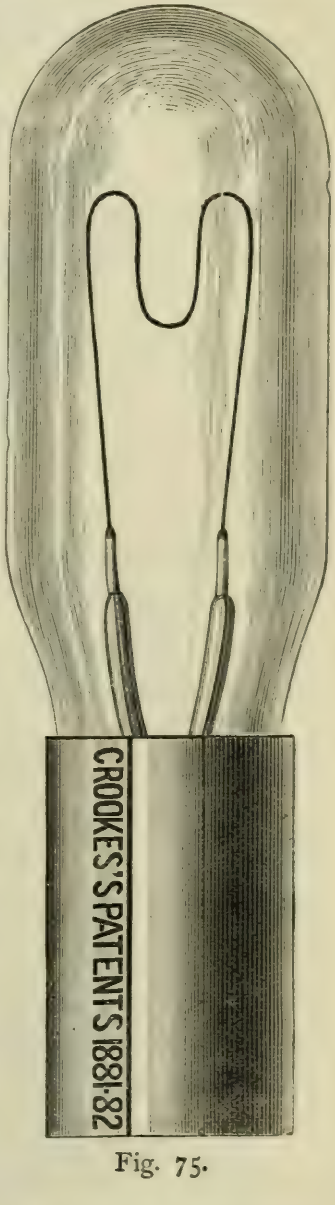

Fig. 75.

Prof. Crookes's lamp is illustrated in Fig. 75. In his specifications of patents reference is made to his method of forming the glass globes of the lamps, to the sealing in of the wires of the lamps, and to the saving of platinum. The difficulty of making a good junction between glass and metal, except in the case of platinum, which, owing to its low conductivity, is liable to heat and crack the glass when large currents are used, Prof. Crookes overcomes by using a compound connecting wire having a core of copper and a platinum sheathing, thus combining the advantages of using a cheaper metallic conductor and one of better conductivity. These lamps are economical at low candle powers, and they can be driven up to very high intensities of light without destruction. An 8-candle lamp has been raised to 100 candles, a 30-candle lamp to 400 candles, and a 100-candle lamp to 1190 candles without injury; therefore the life of these lamps is very high in comparison with many others when driven at their normal candle-power.

From the powerful incandescent lamps employed for illuminating public and private buildings, we come to the smaller lamps of 2 to 5-candle power, which are used for microscopical and surgical purposes, and a brief description of some of the appliances with which they are used will now be given.

The varied and unexpected uses to which electricity has been applied have, during the last few years, developed with almost bewildering rapidity, and not the least important of these are the improved electric appliances for medical and surgical purposes. Amongst the latter are the novel, and least generally known, ingenious appliances of Mons. Trouvé, of Paris, and Dr. M. Nitze and Josef Leiter, of Vienna, with which various parts of the interior and exterior portions of the human body may be illuminated by the electric light and thoroughly examined by the surgeon in a manner that would be impossible by any other means at present known.

Herr Josef Leiter, a well-known instrument maker of Vienna, to whom I am indebted for some of these illustrations, has, with the assistance of Drs. Nitze and Mikulicz, devised a great number of instruments for inspecting the mouth, larynx, œsophagus, stomach, ear, nasal fossæ, urethra, bladder, vagina, rectum, &c. The plan, originally suggested by Dr. Bruck, of preventing any inconvenience from heat by the circulation of a stream of water around the light, has been adopted with these appliances, most of which also provide for the introduction of an objective, which forms an image of the part to be examined. The image is received by an eyepiece either direct or by diversion in the proper direction through prisms.

The Gastroscope.—Leiter's original instrument was a marvel of ingenuity, but in practice, was found too complicated, and a simpler form was devised by Dr. Mikulicz and perfected by Leiter. This instrument is illustrated in use in Fig. 76. It consists of a tube 65 cm. long and 14 mm. thick, and is bent toward the lower

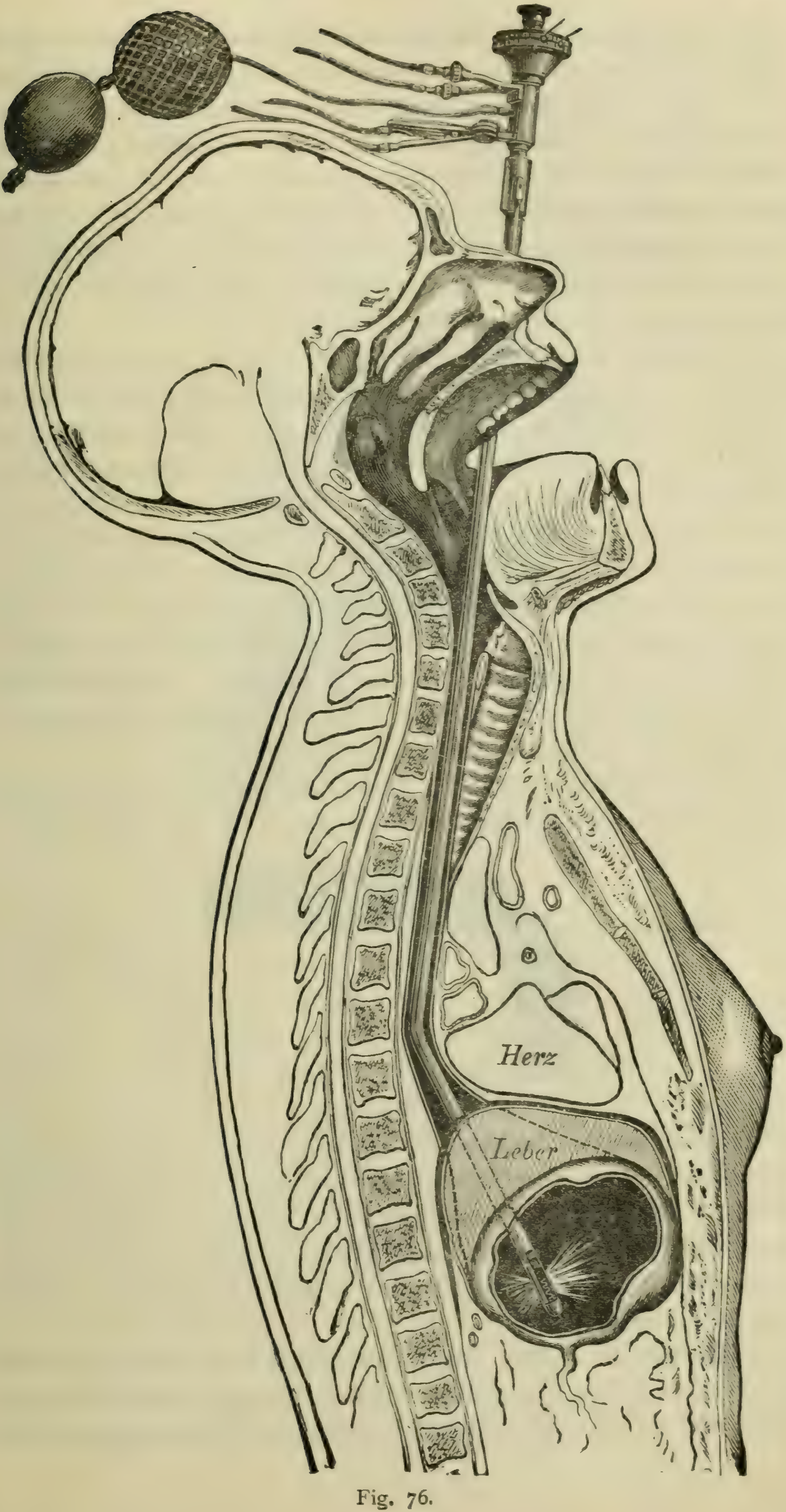

Fig. 76.

end at an angle of 150°. At this extremity the lamp, consisting of a platinum wire in a glass chamber, is placed and is in connection, by means of wires running up the tube, with the key placed at the top of the tube near to the forehead; the two upper tubes pass down the main tube and supply a constant stream of cold water, which prevents the end of the tube becoming heated; another tube in connection with the india-rubber balls is for supplying and inflating the stomach with water, which passes out at the end of the instrument through a small aperture.

The optical arrangement consists of a prism and an objective placed near the light, the prism being right-angled and acting as a reflector to transmit the rays from the side of the instrument up the tube; a second prism is placed at the bend in the tube, and an eyepiece in the cavity at the top or handle of the apparatus. A metal shutter, regulated by a collar placed just beneath the handle, passes over the lamp to prevent the glass from being smeared whilst the instrument is passed down the œsophagus. The light may be worked by a Leclanché battery, but for prolonged observation a Bunsen or bichromate battery is superior. The gastroscope can be passed into the stomach without difficulty, and the eye of the surgeon is applied at the upper end of the tube.

The patient should abstain from food for some hours prior to the application of the instrument; previous to its use a dose of morphia should be administered hypodermically, and the stomach should be washed out. In using the instrument the patient, lying upon the left side, should have the head supported and placed well back, with the neck in its axial position; the instrument, previously lubricated with glycerine or vaseline, may then be passed without difficulty.

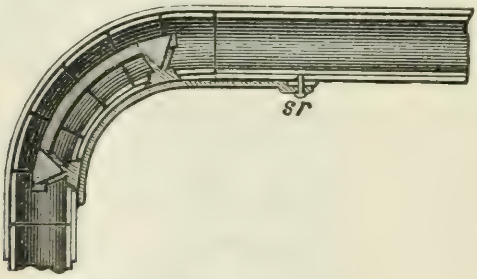

Fig. 77.

Some months ago Mr. Gaddes suggested to me an arrangement for the electric lamp by which a view of the larynx and other parts out of the line of sight might be obtained. This suggestion had been forestalled by a similar arrangement adopted by Herr Leiter in his œsophagoscope and other instruments, and which is shown in Fig. 77; it consists of two prisms placed at right angles in the bent tube, and which act as reflectors of the parts under examination.

Fig. 78 illustrates an Electric Pharyngo-Rhynoscope, and needs no explanation. It may be employed as a laryngoscope and general illuminator of the oral cavity.

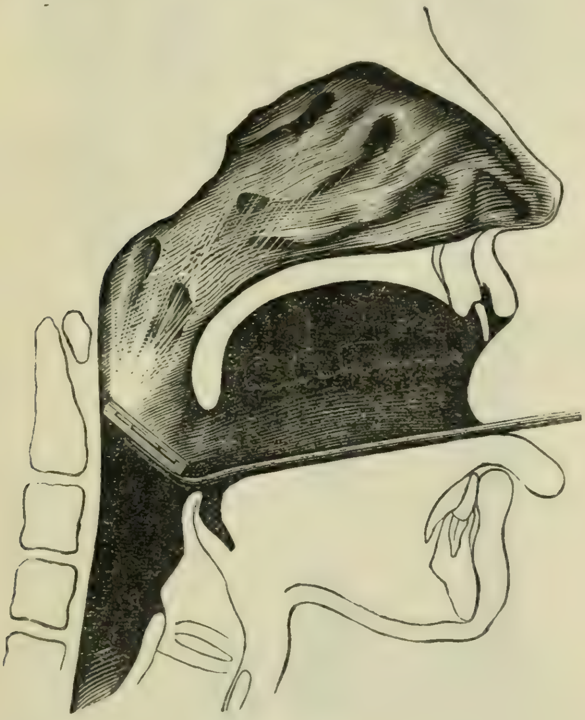

Fig. 78.

Fig. 79 illustrates an Electric Dental Lamp and Laryngoscope supplied by the Dental Manufacturing Company. It is somewhat similar to one I introduced several years back, but has the advantage of a resistance coil, by means of which the flow of the electric current is regulated by moving the button on the right of the handle up or down. As will be seen by the illustrations, the instrument is constructed in sections, any one of which can be replaced when required. For the examination of obscure lesions of the teeth and the preparation of inaccessible cavities in these organs this lamp will be found particularly valuable, especially during the dull weather of a London winter, for any departure from a healthy condition of the teeth can be readily detected in the oral cavity, which becomes brilliantly illuminated by its means. When using this lamp, the button of the resistance coil should always be placed at the extremity near the lamp; on

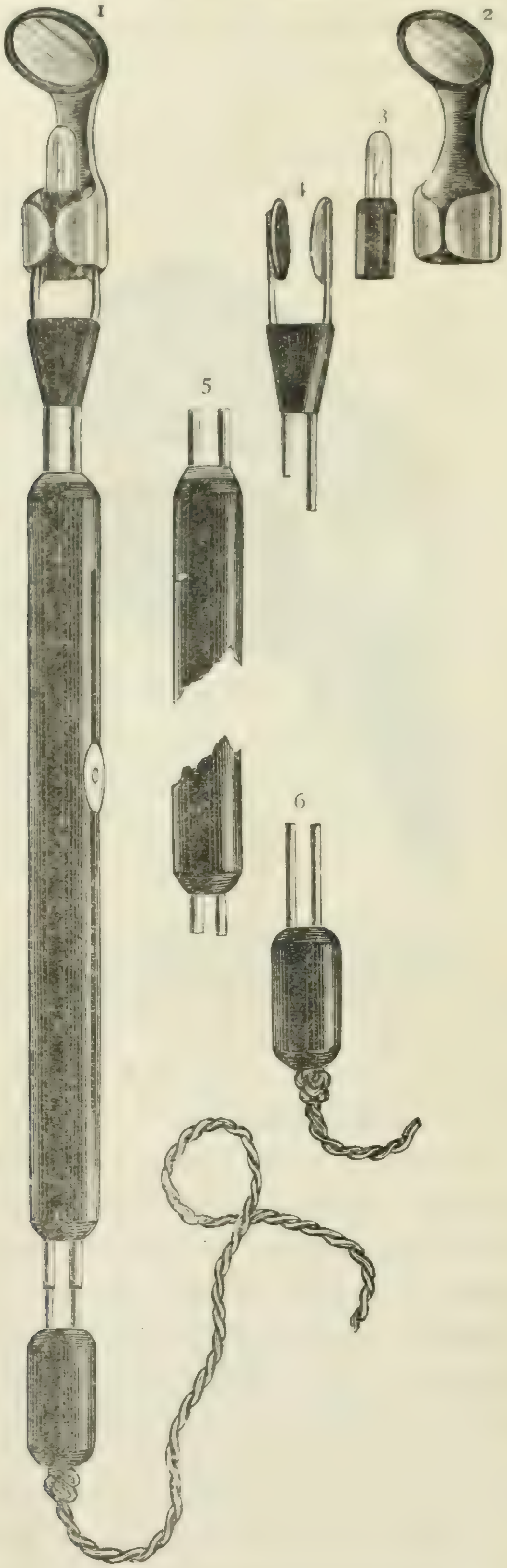

Fig. 79.

applying the current the button should then be lowered until sufficient illuminating power in the lamp is developed; thus destruction of the carbon of the lamp by excess of power may be avoided.

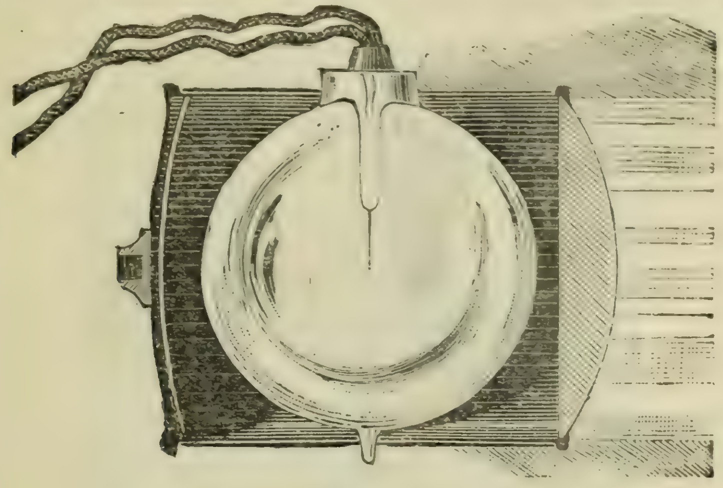

Fig. 80.

Fig. 80 illustrates the Electric Photophore of Mons. Trouvé.* It consists of an incandescent lamp, cased in a metallic cylinder between a reflector and a convergent lens, the current being supplied by means of the flexible wires shown in the illustration. In use the photophore is placed on the forehead in the manner shown

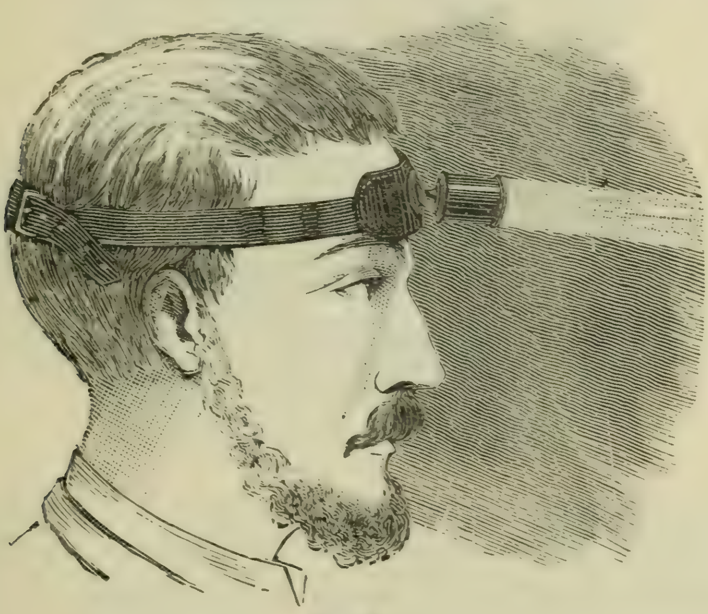

Fig. 81.

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* I am indebted to Mr. Armand Levy, agent to Mons. Trouvé, for the loan of these illustrations.

in Fig. 81, or by an anterio-posterior spring resting on the forehead and back of head. The lamp is fixed to the frontal shield by means of a ball and socket joint, thus allowing the focus of the lens to be changed to any direction with facility. Should it be required to use the photophore in any other manner than on the forehead, it may be readily arranged as a fixed apparatus, as shown in Fig. 82, that can be placed on the table, or fixed by means of screws to any spot desired. With the ball and socket joint the lamp can take all positions required.

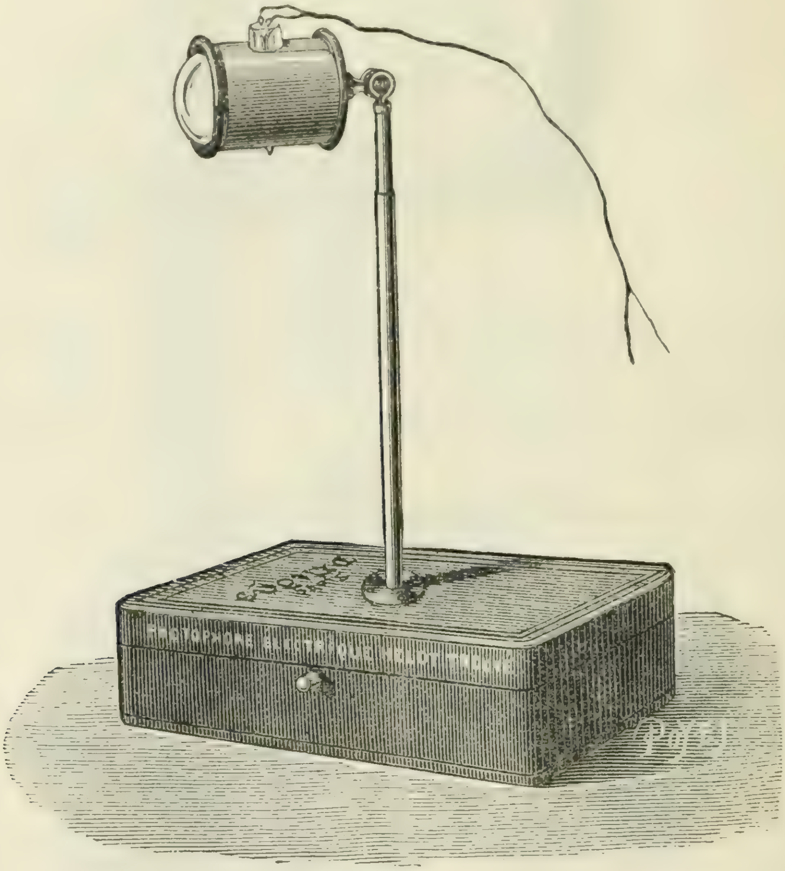

Fig 82.

Fig. 83 illustrates a lamp constructed for clinical demonstrations with the ophthalmoscope, by which a light is supplied in two or four different directions, allowing one to examine at the same time several patients by the same luminous focus. The intensity of this light is equal to from 8 to 10 candles, and a constant current of from 8 to 12 volts is required to successfully work it. This may be obtained from Mons. Trouvé's six-cell battery and super-saturated solution of bichromate of potash.

The value and uses of these surgical electric lamps are great and numerous. Gynecologists will find them valuable in certain delicate operations requiring much light, such as those for vesico-vaginal fistula, and for examinations with the speculum. For examination of the ear, and operations performed on the tympanum and external auditory meatus, for excision of polipi of the nose, and for anterior and posterior rhinoscopy the intensity of the light is of the greatest value. Dental surgeons will find it of the greatest service in the examination of the mouth and teeth; by showing up the transparency of the latter, incipient disease may be detected which might otherwise escape notice.

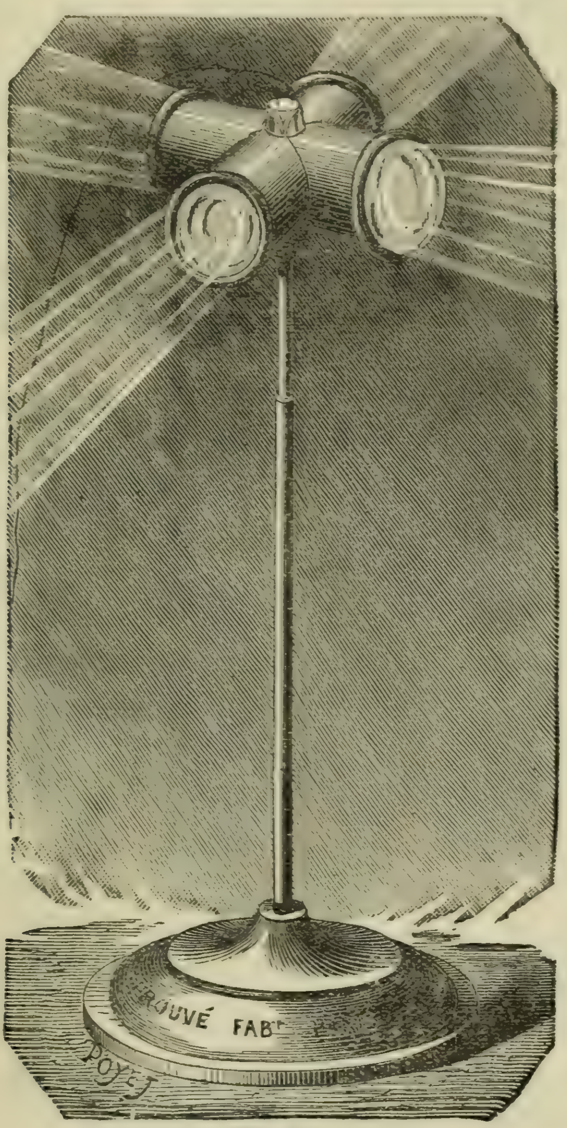

Fig. 83.

REMOVAL OF A FIBROUS TUMOUR ATTACHED TO AN UPPER LEFT MOLAR.

By J. J. LAKEMAN, L.D.S.I.

ON May 23rd, a lady, about 45 years of age, consulted me respecting a swelling over the upper left first molar, and complained of occasional pain. On examination the parts presented the following appearance:—A large molar, with anterior contour amalgam stopping, and upon the labial gum, directly over the tooth, appeared a swelling about the size of a barcelona nut, having a white ivory aspect, and painless to the touch. The tooth had been stopped about twelve months, and during that time the swelling had been coming. Her dentist had repeatedly lanced it, but it gradually increased in size.

I lanced round the margins of the tumour, with the exception of the one coming in contact with the neck of the tooth, and applied, by means of cotton wool, the Mermaid Calorific Fluid to the tooth and tumour for 90 seconds. I then extracted the tooth and tumour intact, without my patient showing any signs of pain. The cavity was then syringed out with a weak solution of carbolic acid and glycerine (1 in 20 of water). There was no excessive bleeding, and my patient expressed herself feeling very comfortable.

I saw my patient again on the 27th. The gum then presented a healthy appearance.

Upon examining the tooth, I find a small cavity below the stopping, and out of it starts the fungus growth; also, the roots of the tumour are securely entwined around the fangs.

BRITISH DENTAL ASSOCIATION.

SCOTTISH BRANCH.

THE third Annual Meeting of this branch of the British Dental Association was held on Friday, June the 5th, at the Queen's Hotel, Dundee. Dr. John Smith, LL.D., presided.

The Secretary (Mr. W. B. Macleod) read the minutes of the last Council meeting, which was held on 27th April, ult. It appeared from the minutes that an advertisement by a member had appeared in a Berwick paper with the following unprofessional announcement:—"Charges strictly moderate." The Council held this to be an infringement of the laws regulating advertisements, and instructed the Secretary to write to the advertiser to that effect, and to request him to withdraw the words. The Secretary informed the meeting that, according to instructions, he had written to the gentleman against whom the complaint was lodged. The gentleman had called upon him, and explained that he himself was not aware of the nature of the advertisement, having entrusted it to a friend in the town of Berwick to be inserted in the paper. He had forwarded the letter to his friend, who had altered the wording of the advertisement and inserted the objectionable sentence, not being aware of any rule against it. The words objected to were at once withdrawn.

It was resolved to hold the next Annual Meeting of the branch in Glasgow.

Mr. W. Campbell (Dundee) was unanimously elected President for the ensuing year, Mr. Wilson (Edinburgh) Vice-president, and Messrs. J. A. Biggs and W. B. Macleod were re-elected as Treasurer and Secretary respectively.

Mr. P. Crombie, of Aberdeen, read a paper on

THE RANGE OF DENTAL INFLUENCE.

He proceeded to show the intimate connection which existed between toothache and facial neuralgia. It was an almost unheard of thing for facial neuralgia, dependent on functional organic Dental disease, to precede toothache. Of course, arising from two causes, such neuralgia is not infrequent, but the initiation here referred to is manifest first at its starting point in the shape of more or less distracting pain in the tooth. It may very quickly set up the more serious affection in some or all the branches of the fifth nerve, and in fact this secondary affection may at once or after some time totally eclipse the primary malady. Pain in the tooth may cease while the pain in the face endures. What is more remarkable, the facial neuralgia may recur without any appreciable antecedent toothache, and so apparently take the initiative in arousing the pain in the tooth. As the Dental decay advances it is easy to understand how at length all sensation may be lost in the tooth itself, while there still are at intervals neuralgic paroxysms in the face. It was plain, therefore, that if the cause must be removed before the effects cease the dentist must regard and deal with the nerve connections of the Dental apparatus.

Further, it was a well ascertained law of nerve irritation that not only does such propagation take place through all the branches of associated nerves, but nerves not in anatomical connection may likewise be affected. Mr. Crombie then proceeded to show that stomachic neuralgia may be due to nerve irritation induced by decay in the teeth. The pain occurred often with a suddenness and intensity, at first transient, and occurring only for a few minutes, and then ultimately becoming more fixed; and he suggested, as well worthy of notice, both by the Dental and the Medical profession, the removal of all decayed teeth from the jaws of such as are the victims of stomachic neuralgia.

Mr. W. B. Macleod read a paper on

THE DENTISTS' ACT AND RECENT PROSECUTIONS.

As it enacted compulsory education, it likewise conserved to those fulfilling the requirements of law certain specific titles and privileges, and also ordained certain penalties and disqualifications upon those who assumed the name or title of dentist, or its equivalent, or who by means of cleverly worded advertisements sought to lead the public by inference to believe that they had been specially trained for the practice of the profession.

But while ordaining compulsory education, the machinery for supplying this education was not provided.

The General Medical Council were appointed as a governing body, and they having approved the curriculum of study required by the Royal College of Surgeons of England for its License in Dental Surgery, the education and subsequent examination of fitness to practise was left to the medical schools, the profession, and the licensing bodies.

Having referred to the passing of the Dentists' Act and the formation of the British Dental Association, he said it was not the intention, and is still far from the intention, of the promoters of this Association, founded for the purpose of maintaining the spirit and provisions of the Dentists' Act, &c., to make use of the law in any harsh or vindictive or narrow spirit; the main object being to secure a liberal and sufficient education for those engaged in or purposing to follow Dentistry as a profession. The prosecution of offenders against the Act was therefore not the sole or even the primary object of its institution.

During the first years of the existence of the British Dental

Association, its efforts were entirely devoted to the establishment of machinery calculated to promote the advancement of Dental and the allied sciences, to foster honourable professional intercourse, and to encourage the founding of educational centres.

The first years of its existence being entirely devoted to these ends, it was not till 1883, five years after the passing of the Act, that steps were taken to institute a prosecution and vindicate the law which, owing to the generous forbearance of the Association, was being openly set at defiance. A case was began against one, G. Callander, but this never came before the court, owing to Callander deeming prudence the better part of valour and disappearing before the steps necessary to bring him before the bar were concluded.

In February, 1884, however, a case at the instance of the Association against one T. C. Holford, for illegally using the title of L.D.S., came before the magistrate at West Ham Police Court, and was by him decided in favour of the prosecutor. Shortly afterwards steps were taken to initiate a prosecution in Scotland, and two cases were selected. The first case was on the 25th of October, 1884, when William Robertson was charged at the Edinburgh Sheriff Court, before Sheriff Rutherford, with infringements of the Dentists' Act, in so far that he, not being registered, made use of the title "Dentist," and otherwise published advertisements which implied that he was registered or specially qualified to practise dentistry. On the case being called Robertson pleaded guilty, and, through his agent, stated that he would not offend again. Being the first case of the kind before the court, and no doubt influenced by the promise not to contravene the law in future, the Sheriff imposed a mitigated penalty of £5.

Notwithstanding the promise made to Sheriff Rutherford, Robertson continued to infringe the law, and was, in consequence, again charged on the 9th of January, 1885, before Sheriff Rutherford, with similar offences. The accused again pleaded guilty, and was on this occasion fined £20.

The next case was that of Alexander Ross French, of St. Andrews, in the county of Fife, lately confectioner in Dundee. On being charged with offences against the Act, he, on the 27th of February, 1885, pleaded "not guilty," and the case was consequently adjourned for the production of evidence. On the 6th of March, 1885, the case came on for hearing before Sheriff Henderson at the Sheriff Court, Cupar, Fife, proof having been led by the prosecution, the defendant defended himself. The accused was found guilty, and, with the concurrence of the prosecution, a mitigated penalty of £10 was imposed. These cases were all taken at the instance of the British Dental Association, Mr. Canton, Hon. Sec. to the Association, and Mr. Macleod, Hon. Sec. to the Scottish Branch, being the nominal prosecutors.

The results have been that in each case the accused have abandoned the unlawful use of the titles and descriptions, which belong exclusively under the Dentists' Act to those whose names are entered upon the Dentists' Register.

Further, the clear and definite opinions of the judges before whom these cases were tried have placed beyond doubt:

1. That no person can append to his description the letters L.D.S. unless such title has been conferred upon him by one or other of the licensing bodies.

2. That only those whose names are upon the Dentists' Register, issued by the General Medical Council, can make use of the title or designation or description of "dentist," "dental surgeon," or "surgeon dentist;" or make use of any name, title, or description, implying that he is registered under the Act, or that he is specially qualified to practise dentistry.

3. That each separate advertisement, or publication on separate sign-boards or localities, constitutes a separate offence, and as such is liable to the full penalty of £20.

4. That the publication of an illegal advertisement in a newspaper is a contravention of the Act, and that the repetition of the advertisement in a separate issue of the newspaper on a succeeding day or days constitutes a separate and distinct offence, and therefore each such repetition is liable in the full penalty of £20.

There is one point which I think has been made clear during these prosecutions, viz., that it would be much better for all parties concerned if the nominal pursuer should be some neutral party, such as our appointed law agent, instead of, as formerly, an honorary official of the Association, who, of necessity, is a member of the profession in practice. I do not regret the part which, in my official capacity as your Hon. Sec., it was my duty under the circumstances to take, but experience has shown that the work could be better done by an accredited agent outside the Dental profession.

In pleading for a neutral prosecutor in all future actions, I may briefly state my reasons for urging this course :—

1st. That in having a neutral party it would be at once apparent to the public that no private motives had instigated the prosecution.

2nd. That the prosecutor would not be likely to be subjected to malicious and scurrilous attacks, anonymous or otherwise ; or if so, he, the prosecutor, being free from professional etiquette and restraint, could answer such attacks as they deserved.

3rd. In the event of the prosecuted pleading not guilty, it would not necessitate the leaving of private business, and the consequent loss of time and professional emoluments which are, under the present mode, inflicted upon your Hon. Secretaries.

It need hardly be said that into these prosecutions no private motive was permitted to enter ; on the contrary, the accused were, as individuals, entirely unknown to the Hon. Secretaries or the Council of the Association, and action was taken against them solely upon their public appearances, but—in one case at least—this did not prevent your representative from being personally subjected to misrepresentation and annoyance.

The President, at the conclusion of the reading, said every member of the Association owed his best thanks to Mr. Macleod for the great trouble he had had in connection with these prosecutions, and for bringing this objectionable practice to a termination. He thought he was quite right in suggesting that these prosecutions ought to be undertaken by neutral parties. It was exceedingly invidious for a Dental practitioner to have his name banded about as a prosecutor in cases such as these, and he was afraid that it would not be easy to find among our members another Marcus Curtius ready to jump into the gulf for the sake of the respectability of the profession, as Mr. Macleod had done.

The following resolution was then agreed to and ordered to be communicated to the Representative Board :—" That in the opinion of this meeting it is desirable that all future prosecutions should, if possible, be conducted in the name of a neutral agent."

Mr. Campbell then showed a patient who had been treated by Mr. Macleod at the Edinburgh Dental Hospital. He was a seaman, and whilst engaged in unloading a ship in the harbour of

Dundee, the claws hanging from the crane struck him a violent blow on the cheek. A few weeks after a swelling began on the cheek, and in a few months this grew to enormous dimensions, not only externally, but internally, involving the gums and palate. He went to Edinburgh, where the left half of the upper jaw was resected by Professor Annandale. In January last, at Mr. Campbell's request, Mr. Macleod took him in hand at the Dental Hospital, and made an upper denture for him, which to a great extent replaced the lost portion of the jaw.

Mr. Campbell handed round a model of the upper jaw, remarking that it did Mr. Macleod great credit to have been able to get so perfect an impression, since the man's mouth was considerably contracted, and the jaws could not be widely separated in consequence. That Mr. Macleod had been able under these circumstances to get such an impression and to make such a denture, said a great deal for his mechanical skill.

The patient was then examined by the members, and the success of the operation very favourably commented on.

Mr. Campbell then called attention to a case of double fracture of the lower jaw, to the left of the centre and at the ramus on the right side. His object in doing so was to show how very small a wire could be used for the Hammond splint. He had no idea that so thin a wire could be used as a splint and give so good a result.

The President then delivered his

VALEDICTORY ADDRESS.

With the advent of this meeting my term of office as President of the Scottish Branch of the British Dental Association comes to a close, and in resigning to my worthy successor that honourable appointment, I do so with feelings of congratulation to him as entering upon a pleasant and an interesting duty, one in which he will find every assistance, much kindly feeling, great consideration, and ungrudging lenity extended to him on all occasions by those composing the meetings and engaging in the discussions over which he will have to preside.

The provincial Branches of the British Dental Association—and noticeably among them the Scottish Branch—render the work of the parent society much lighter and much more precise, perspicuous and to the point in many cases, than would be possible were all the business to be carried out away from its own locality and surroundings, and concentrated exclusively at the head-quarters of the Society in London. The peculiar province and the special nature of the objects and action of these Branches thus renders their existence desirable. Some of these objects have been exemplified and discussed, as you have just heard, at the present meeting, and may well illustrate the labour, foresight, and discretion required in the discharge of its functions by such a body as the British Dental Association. The opinions which I advanced when I had the honour of entering upon my Presidency in March, 1883, I still hold in respect to the institution of Branches as adjutants in discharging the functions of the main Association, and facilitating, as I then said, "the consideration of, and the expression of opinion on, matters affecting the welfare of the Dental profession, without entailing the trouble and expense of members in Scotland requiring to be present in London for such purposes." Let me take as illustrations of such matters two, perhaps somewhat trivial, but, at the same time, broad and general examples of what might advantageously be considered by a branch society.

You will remember that at that time the prospective medical legislation on hand rendered it questionable, in the event of a State examination superseding those of the medical and surgical licensing bodies, whether those corporations would care, when thus deprived of their major examining privileges, to continue, or whether they would even be allowed to retain, the Dental examinations in their own hands; and how far these examinations might possibly in such an event be modified, both in their extent and in the mode in which they might be conducted, and to this matter I drew the attention of the Branch. Happily for the Scotch corporations and for the cause of medical education and licensing in Scotland, where they had attained a perfection and achieved a success admitted as a model for all other schools of medicine, those proposed changes were not carried out, and Dental education and licensing remain as they were.

But if in Scotland no alteration has been made in the arrangements of the Dental examinations since that time, considerable changes have taken place in examinations for the medical and surgical diplomas of the corporations. Previously the single diplomas of the Royal College of Surgeons of Edinburgh and of the Faculty of Physicians and Surgeons of Glasgow were registrable qualifications, each one of itself conferring a license to practise. Now, these diplomas are not granted singly, nor is admission to any examination for them allowed to candidates who are not already registered medical practitioners. Any candidate not medically registered must take the conjoint qualification of all the three licensing bodies in Scotland, namely, the Royal Colleges of Physicians and of Surgeons in Edinburgh and the Faculty of Physicians and Surgeons in Glasgow, to constitute a registrable medical qualification, outside the universities. This was introduced in accordance with the principle acted upon for many years in Scotland, and which indeed has ever since been the genesis and keynote of every Medical Bill introduced in England, that every license for practice should include both a medical and surgical qualification. I need not occupy your time by going into details in this matter further than relates to the Dental examination. Instead of the examination for the triple qualification being divided into two portions, as was the case under the former system, it now consists of three—the old first professional examination being now replaced by the first and second of the new system. This change, although affecting the Dental examinations in Scotland in no material or direct manner, still has a certain bearing upon them. These examinations were modelled upon the lines of the surgical examinations, and the first professional Dental examination was conformable to and embraced the same subjects as the first surgical one. This I consider was an advantage in some ways. The passing of the one examination, namely, the first surgical, was held as exempting a candidate from the first Dental examination ; it was upon the same subjects, nearly as easy, and was conducted at one sitting, as the Dental was. Now, however, it is likely that the first and the second surgical professional examinations will both require to be passed to confer such exemption. This I have said may be a matter of no material importance, and it is of less moment to exclusively Dental than to those who may be also Surgical candidates. But it interferes to a certain extent with that identity of character previously existing between the two examinations, and with the option of candidates who might wish to be prepared for adding a Surgical to their Dental diploma, and who, with such a view, might wish to have the choice of either of the two first examinations respectively.

Nor is it without a practical bearing in other respects. The question has actually arisen within the last month, whether a prize formerly open to students who had passed their first surgical professional examination, might not be offered to Dental students, also, who had passed their first professional examination, and the difficulty hinged, and still hinges, upon the alterations described. This I bring forward as a matter illustrating those instances which, being local, are much more easily deliberated upon and discussed by a Branch than by the Parent Association.

Let me just mention one other matter, where some care and circumspection on the part of the Scottish Branch, and indeed of any of the Branches, may be required. It was only this day week that I was handed, for my opinion and decision, an application for admission to the Dental examination of the Royal College of Surgeons of Edinburgh by a lady candidate, whose claims were indeed of no inferior order, whose preliminary examination fully entitled her to admission, but whose professional education—so far at least as the non-special subjects were concerned—is and must still be for a time *sub judice*. A great amount of care would have to be exercised whether we are to refuse or admit ladies as dentists (cries of "admit" and applause). Well, if you say admit, you are in danger of coming in conflict with a number of different bodies, for in some of our colleges and universities there are great differences of opinion on this question. The subject is one which ought to be very carefully handled, but it is one which I think might come under the consideration of a Branch Council such as we now constitute, and in considering it we have to take notice of the fact that this is a case where the general body might find itself in conflict with local educating and licensing interests, and where a branch association—dispassionately and impartially investigating and pronouncing upon such a question as the admission of female candidates for Dental education and licensing—might be of much service in aiding the action of the licensing bodies.

I shall not, however, tax your patience or my own abilities by attempting to say much more on the sphere of action or the advantages derivable from these branch associations. As I have already said, their object is to facilitate the work of the Parent Association, and the work of the Parent Association is to see that the provisions of the Dentists' Act are carried out. These provisions are—as stated by Sir John Lubbock in the debate on the second reading of the Bill, on February 19th, 1878—"to protect the public against quacks, by giving them an opportunity of ascertaining whether dentists were properly qualified." The Bill was not intended to uphold the interests of a particular class, neither are the objects of the Association to be construed or interpreted as intended for individual or party purposes. Nothing would be more likely to alienate the sympathy of the public than such a suspicion, and I am sure that I can say nothing is further from the intention of either the Parent or Branch Associations.

The nature of a valedictory address does not call for, nor indeed does it admit of, discussion, and the remarks I have offered, and the subjects upon which I have touched, are therefore advanced more as matters of information or suggestion than otherwise, being possibly questions which may come to be dealt with under our new President, and having done so, I have now simply, and so far as my office is concerned, to bid the Scottish Branch—and in the literal sense of the expression—farewell.

A hearty vote of thanks were awarded to the President, Dr. Smith, for his valuable services during the past year, after which the meeting adjourned.

THE DINNER.

In the evening the members of the Association and a number of friends dined together in the Queen's Hotel. Mr. Campbell, the newly-elected President, occupied the chair.

The Chairman proposed "The British Dental Association."

In the course of his remarks he said he thought the itinerating nature of the Society to be a very valuable one, for in every place to which it goes it draws into itself a few of the less active members of the profession. He could not conceive men having a love for their profession keeping aloof from such a Society as the British Dental Association, where certainly they would profit from the experience of their fellows, and get that conceit, which is so apt to grow from separation, taken out of them.

He had the privilege of coupling with the toast the name of Dr. Smith, who has done more than any man in Scotland to advance the cause of Dental education, and indeed to lift the Dental profession to a place of honour. He has been President of the Scottish Branch, is now President of the British Dental Association, and has been re-elected President of the Royal College of Surgeons, showing in what esteem he is held by his fellows.

Dr. Smith, in reply, said the British Dental Association could not inflict any punishment; it could not erase a name from the register, any more than it could place one on the register. It was the prerogative of the General Medical Council to do this; they could pronounce what was infamous conduct, and what they pronounced to be infamous was beyond appeal. The General Medical Council was the body to be appealed to in any such case. The medical corporations were exceedingly slow to take up any action of this kind. They were averse to undertake anything they were not absolutely certain of carrying out, and he thought that was a very wise example which the British Dental Association would do well to follow. It ought to be very cautious in undertaking any prosecution where it did not see its way thoroughly to carry it out. The Association has been accused of want of vigour in its attacks on men of that kind. He thought the Association had erred on the safe side in not taking up these cases precipitately; but he had no doubt that, when occasion arose, the Association would in a dispassionate and impartial manner take up such cases and carry them out firmly and circumspectly to a successful issue.

Other toasts were acknowledged, and songs and recitations were given.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE last ordinary Monthly Meeting of the above Society for the present Session was held at 40, Leicester Square, on Monday evening, June 1st, Mr. C. Spence-Bate, F.R.S., President, in the Chair.

Mr. Oakley Coles, in the absence of the Librarian, announced the receipt, as an addition to the library, of Dr. Herbst's work on "Filling Teeth with Gold by the New Method."

Mr. Redman remarked, with regard to a case that he showed of absorption of a first molar consequent upon the pressure of the bicuspid, that the tooth which had caused the absorption was so low down that the crown could hardly be seen, and at the time of consultation it was mere conjecture that the pressure of that tooth might be the cause of the pain the child was suffering from. The patient was fourteen years of age, and the amount of absorption in the tooth was very surprising.

He also showed a split bicuspid. There was nothing in any way to account for the fracture, and it must consequently have been from "explosion of the pulp."

The President showed the model of a case of a split second molar which he had treated, first with elastic bands and afterwards with a little gold wire tied round to bring the parts together. He had then treated the tooth with chloroform, drilled it out, and filled with amalgam. The tooth gave every sign of being once again very useful.

Communications were also made by Mr. Andrew Wilson, Mr. Maggs, and Mr. Coles.

Mr. C. S. Tomes made a communication on

SOME EXPERIMENTS ON AMALGAM FILLINGS.

He said that he felt almost ashamed to bring before the Society the very small number of experiments he had made lately with amalgams, especially when he considered the very careful and extended tests which had been made by Dr. W. St. George Elliott. The experiments he wished to mention were very few in number, but inasmuch as they were of a different kind from those made by Dr. Elliott, and were all of a practical tendency, he thought it well to place them before the Society that evening, especially as it would be some time before he should be able to continue his experiments.

The direction he had taken up was the question of water-tight fillings made by amalgams. He had only used plastic amalgams in his experiments, as he considered that they wanted an amalgam which was sufficiently plastic to be easy to work. This was not the case with a dry amalgam. The only thing which had induced him to make the experiment he had done was that Dr. Bonwill had showed him at Philadelphia, last Christmas, some amalgam fillings of exceptional excellence, and had also exhibited his method, which he (Mr. Tomes) considered to be quite different from what he had before seen, it being, in fact, virtually to squeeze the amalgam into the cavity of the tooth. Dr. Bonwill's method was to put the amalgam into the cavity in a very plastic form, make a pad of amadou or paper and so squeeze the amalgam into the cavity, removing from time to time the more plastic portions of the amalgam which would squeeze out of the cavity. In certain cavities Dr. Bonwill used the adjoining tooth as a matrix; and in cases of the cavities in two teeth meeting, Dr. Bonwill filled the space as one, and then cuts through the amalgam between the two cavities.

Mr. C. S. Tomes said the great difference between the usual method and that employed by Dr. Bonwill was, that the mercury from the amalgam was practically squeezed out from the cavity, and not done before inserting the plug. He (Mr. Tomes) had in using amalgams discarded all varnishes. If the stopping was water-tight in a cavity the most penetrating ink stain could not get in. He had heard it said by some that Draper's ink was too strong a test, but he did not consider that such was the case. If a plug were really water-tight the ink could not stain it; if it did stain, it was quite evident that contraction in setting was the cause, or that it could never have been a water-tight filling.

He had found that if he took some Bonwill's amalgam, mixed in a tolerably plastic form, and then packed it into the cavity with burnishers, he did not get a water-tight plug.

In the experiments which had been carried out by Mr. Baldwin and himself, they had both found that if they plugged a tooth by Dr. Bonwill's method, they could depend upon their plug being water-tight.

This applied also to several other amalgams which they had experimented with in addition to Dr. Bonwill's.

If at any time they had an amalgam filling which was not water-tight, the edge should always be looked to, as he had found that in cases where the cavity had a thin feather edge, leakage was invariably the result. This seemed to be a very important point with regard to a cavity for an amalgam filling (it was of course the reverse for gold fillings). It was unfortunately in some cases unavoidable, as feather edged cavities would occur; but they could depend upon one fact, and that was, the squarer the edge of their cavity, the more water-tight would be their plug.

Packing amalgam with burnishers, not only with the Bonwill amalgam, but also in the standard alloy, was not satisfactory; they could only get water-tight fillings more or less, but no dependence could be placed upon them.

He also tried putting into the plastic amalgam pieces of amalgam which had previously become set, so as to lessen the shrinkage of the setting mass. He had also tried using a piece of amalgam (previously set) shaped to fit the cavity, and then carefully packed all round in a very solid manner. All the various experiments he had adopted, and as far as Mr. Baldwin and himself had experimented, they were led to the conclusion that Bonwill's method was the best, namely, to put the material in, in a very plastic condition, pack in with heavy pressure, and remove the soft portions as they came out of the cavity.

Mr. Tomes, in conclusion, said that his experiments had not been numerous enough or sufficiently widely extended to prove anything, and must be simply regarded as suggestions.

They wanted to use a good plastic amalgam in large molar crown cavities, and it would be a good thing if they could find out the best method of manipulating it. Dr. Bonwill's method of packing amalgam was described as follows by Mr. Ewbank in the *Journal of the British Dental Association* :—

"I wish to communicate to the profession a rapid, easy, and effective method of plugging teeth with amalgam, kindly shown to me by its originator, Mr. Bonwill, of Philadelphia; and as this way is particularly suitable for contour work, I will describe the filling of two interstitial cavities, taking for example the proximal surfaces of a first and second molar. The teeth having been previously separated, the cavities are excavated, the cervical margins, when practicable, being cut down to the level of the gum, and the lingual and labial walls largely removed, so that the edges of the fillings may be well exposed. Small grooves are then cut on either side, and, as a rule, retaining cavities made on the masticating surfaces. The amalgam (Dr. Bonwill's amalgam for fixing his crowns) is now mixed with sufficient mercury to make a firm though plastic mass, and, the cavities having been dried, a small portion of the mix is placed in and between the cavities, and worked in first with a burnisher, and then pressed home by placing on it a pellet of bibulous paper, and applying to the pellet very considerable pressure with a blunt-pointed steel instrument. More amalgam is inserted and condensed in the same way, and the process repeated until the cavities are completely filled, when, finally, great pressure is applied through a pellet of paper, by means of an instrument devised by Dr. Bonwill for fixing his artificial crowns (bicuspids and molars), which consists of an india-rubber buffer about half an inch in diameter, slightly projecting from a ferrule fixed to a wooden handle, the surface of the rubber and ferrule being at an angle of about forty-five degrees to the axis of the handle, to allow of its being applied to the back teeth. The fillings, or rather the filling—for at this stage there is only one—is now cut away until the bite is free (this being done first to prevent any chance of the amalgam being dislodged), and then roughly shaped at the cervical margin with thin steel instruments, but not divided at the surface, and the operation is completed for that sitting. On a subsequent day, when the amalgam has completely set, a division is made with a very thin band-saw, and the fillings shaped with hard rubber and corundum discs at the sides, and with conical fissure burrs at the cervical margins, and finally finished by polishing with pumice powder, &c.

"The principal peculiarities of this method are, filling proximal cavities together, by which much time is saved, and using considerable pressure on pellets of bibulous paper, by which process the amalgam is thoroughly adapted to the walls of the cavities, while all excess of mercury is squeezed out at the sides, and the crumbling—so common a source of trouble when using very dry amalgam—avoided.

"Dr. Bonwill frequently separates teeth by means of a temporary filling of red base plate, placed in and between the cavities, which, being bitten on, spreads laterally, and in the course of a month or so makes the requisite space."

Upon that method they had not further advanced in the making of water-tight amalgam fittings.

DISCUSSION.

Dr. Elliott had heard some two years ago from Dr. Bonwill respecting his method of filling cavities with amalgam, and had filled cavities in that way with more or less success; but he certainly had not found the method to be superior to the old, as Mr. Tomes had done, from his experiments. He did not, however, consider that stoppings in patients' mouths could practically prove very much, as the conditions of each mouth varied so very much that it was impossible to get reliable information in that way.

Mr. Oakley Coles had only recently examined some specimens of amalgam sent out by Fletcher, of Warrington, some years ago, in glass tubes with Draper's ink underneath.

He had discovered that no leakage through had occurred, but the ink had penetrated the amalgam plug, clearly showing shrinking of the filling, to the extent of about two-thirds its depth. He considered a cylindrical form of cavity to be undoubtedly the best, and less liable to shrinkage than one which was shaped with a bevelled margin.

Mr. F. Canton said that gutta-percha fillings were not water-tight, and yet prevented decay. Was it necessary to have an amalgam filling water-tight to be a good one?

Mr. Stocken had always used his amalgams as dry as possible, so as to ensure a plastic stopping when finished. He thought that, by the Bonwill method of filling, the mercury squeezed out would carry with it some of the constituents of the amalgam.

Mr. S. Bennett said that Dr. Herbst had sent, early in the year, some specimens of amalgam plugs filled with rotary burnishers. Dr. Herbst laid down the rule that in preparing the cavities for his method of gold filling or for amalgam there must not be a chamfered edge of any description.

Dr. Field had not made any practical experiments with amalgams out of the mouth. He invariably used the rubber dam when putting in an amalgam filling, as he considered that better results could be obtained in that way.

Mr. W. H. Coffin was inclined to think very highly of the Bonwill method, for the very sufficient reason that his father had filled amalgam in the same way for the last fifteen or twenty years. Dr. Bonwill had undoubtedly introduced the method quite independently, and deserved every praise for bringing it before the profession.

Mr. Hutchinson, Mr. Wilson, and Mr. B. Mason joined in the discussion.

Mr. Tomes having briefly replied, the President called upon Dr. Field for his paper on "Pivot Crowns."

Dr. Field said the few remarks he intended to make had been suggested by what had been said at the previous meeting with reference to the durability of teeth pivoted by the old method. He had nothing new or original to bring forward on this subject, but he wished to offer one or two arguments in favour of a more modern and more elaborate method of attaching porcelain crowns to roots. He could bear witness to the durability of teeth pivoted by the old method, but he believed that at the present day dentists had to deal with very different conditions, and that their methods of practice must be modified accordingly. In the first place the quality of teeth which the practitioner of the present day had to work upon was not so good as that which fell to the lot of their seniors. In the second place it must be remembered that in former days it was rare that any but a sound root was pivoted, and that many teeth which would now be saved would then have been extracted without hesitation. The apparent success of the old method was not due to the means employed, but rather in spite of them, just as similar teeth were saved by gold and amalgam fillings inserted in a manner which would not be considered creditable at the present day.

It was with the inferior quality of teeth and under the less favourable conditions with which practitioners were now expected to deal, that he claimed superiority for the method he was about to describe, and which had been first introduced by the late Dr. Marshall Webb.

Supposing the root to be in a healthy condition, the first steps were to enlarge the canal to as near the apex as was prudent, close the apex, grind the end of the root level with the gum, and polish its marginal surfaces. A suitable crown must then be chosen, fitted to the root, and backed with thin gold. The pivot should be either square or triangular gold or platinum wire, sufficiently long to extend to the end of the canal when soldered to the backing. Next place the tooth and pivot *in situ*, fasten them together with wax, remove the whole carefully from the mouth, enclose in plaster, and solder the pivot to the backing. Then by means of corundum or emery discs, cut a groove on both sides of the porcelain and across the cutting edge above the backing ; into this the cohesive gold must be carefully packed. Having prepared the crown, adjust the rubber dam, fix the pivot in the root by means of a good quick-setting oxychloride cement, leaving a space of one or two lines between the porcelain face and the root. When the osteo is sufficiently hard, remove enough from around the pivot to obtain a firm foundation for the cohesive gold, then proceed to build up the contour of the tooth into the grooves already mentioned. When completed, finish with great care, giving special attention to the margins, this being the weakest point in all operations upon the teeth.

He had not gone into all the details of this method, but he thought the description he had given would enable anyone who chose to exercise his manipulative skill to fix such a tooth properly.

The advantages of the Morrison crown over a pivot tooth were, first, the ease with which they could be fitted to bicuspid and molar teeth; second, the firm support given to the root by the closely fitting band and the great strength of the whole combination; thirdly, they may be used on roots which would be condemned as useless for ordinary pivoting. The root should be prepared by cutting down to the gum, and removing with a fissure burr any inequalities of the periphery and all the enamel edges. A strip of 22-carat gold as wide as the length of the proposed crown is then fitted as accurately as possible to the root. The cap or cusps should then be struck up, fitted and soldered to the band, the depressions inside the cap having been previously filled up with solder. The root canals should be prepared as for the Webb pivot, and the wires fixed in the canals with cement in the same way; these should extend as far above the root as possible without coming in contact with the crown. The gum having been pressed from the root and the parts kept thoroughly dry, the crown is filled with cement, placed on the root and driven home with a few taps of the mallet; a small hole should first be drilled in one of the cusps through which the surplus cement may escape. Dr. Field then handed round one of the crowns, and also the steel dies from which they were made.

After some discussion, the meeting adjourned till November 2nd.

JOURNALISTIC SUMMARY.

THE INDEPENDENT PRACTITIONER. *(June, NEW YORK.)*

"BIOLOGICAL STUDIES ON THE FUNGI OF THE HUMAN MOUTH," by Prof. W. D. Miller. This article will be reproduced *in extenso* in the August number of the *Dental Record.*

"THE CONSTRUCTION OF SURSEN'S OBTURATORS," by Dr. Th. Weber. This article is concluded from the May number of the *Independent Practitioner.*

"A STUDY OF TOOTH DEVELOPMENT," being an epitome of a paper read before the Odontological Society of Pennsylvania in April last, by Henry Beales, jun., M.D. From this theory regarding tooth development, and especially the formation of enamel, may be formulated the following conclusions, viz.:—Teeth evolve from the epiblast and mesoblast; the enamel and cementum are derivatives of the epiblast, the dentine of the mesoblast. Enamel is evolved from the inferior zoe of the trinzonal base described. The inferior zone receives its material for elaboration from the pulp, by means of the polar prolongations of the odontoblasts, which traverse the dentinal tubules, and are in direct opposition to, and in many instances continuous with, the enamel rods. (It may be observed that those conclusions are not in accordance with the teaching of recognised authorities.)

"THE USE OF COCAINE BY HYPODERMIC INJECTION FOR EXTRACTION OF TEETH," by D. W. Barker, M.D.S. In the majority of cases complete insensibility to the pain of extraction may be produced by injecting, with an ordinary hypodermic syringe, five drops of a four per cent. solution under the gum, directly over the root of the tooth to be extracted. It will take from five to eight or nine minutes to get the full anæsthetic effect of the Cocaine. Pricking the gum to test its insensibility will indicate when to extract. The extent of insensibility is limited to a small space around the place of injection, and the effect lasts from ten to fifteen minutes, and then passes away.

An important fact to be kept in mind is that the agent is injected directly into the circulation of the patient; hence the drug and its solution should be the purest possible, and the instrument absolutely clean. In order that the solution may be of the best, it should be made of distilled water; all ordinary water contains some organic matter, and a solution made of it will sour in about a week and become not only unfit for use, but positively dangerous.

In making the injection care must be taken to inject no air into the tissues; this may be avoided by drawing some of the solution into the syringe, then turning the point upward and expelling the liquid; any air in the syringe will go out first; then fill the syringe as full as required. To avoid running the point against the edge of the alveolus, and also to avoid the thick and somewhat tough margin of the gum, let the point enter the gum an eighth of an inch from the margin, and, following the surface of the bone, pass in at least three-eighths of an inch; if the bevelled side of the point is held next the bone it will avoid sticking against it. Press on the piston rod gently and slowly, so as to expel the liquid a drop at a time; inject half of the five drops on one side (buccal or labial) of the tooth, and the remaining half on the other (palatine or lingual) side; hold the syringe point still for half a minute, and then withdraw it slowly, so that the liquid may be taken up by the tissues and not spurt back when the point is withdrawn. For molars, injection may best be made horizontally, instead of vertically. If there are two or three roots standing close together, the injection should be made midway between them.

I have been asked if the injection itself does not cause pain. If the gum is first bathed with the solution and the syringe needle is kept very sharp, there need be little cause for complaint. The wound always heals kindly and quickly, and there is never any swelling or pain, or any sign of local inflammation or systemic disturbance; the place where the injection is made causes no trouble, but heals with the rest of the wound, and all sign of it disappears.

"DENTAL HYGIENE," by G. L. Curtis, D.D.S. This is a paper which was read at a Union Meeting of the Fifth and Sixth District Dental Societies. As is well known, a judiciously applied stopping will arrest decay and save a tooth for years of usefulness to its owner, but a course of treatment that will effectually prevent the first appearance of decay is as yet almost unknown, or at least unheeded, in our profession.

Constitution, health, nutrition or habits of living all bear so directly upon the teeth and their construction, that in this age of so-called civilization, with its artificial means of living, the dental organs have degenerated, until they seem almost beyond the reach of remedial agents. Local treatment, however, and constant care in daily life, will accomplish much.

At the Seventh Annual Meeting of the Dental Society of the State of New York, held in May last, Dr. Barrett said that degrees had been loosely granted by more than one American college, and as a consequence American dentistry, and American schools, and the distinctive American degree, had been brought to open shame. England had practically closed her doors against our degree. Germany refused to acknowledge it. France was moving to shut out American dentists, and even Switzerland was legislating against it. Whereas, once the name of American dentist and graduate of an American dental college was the proudest title that one could bear, and was a distinction sought by all the world, to-day we saw the D.D.S. virtually disestablished in Europe, and in some cases made even a term of reproach. And all this had been brought about—not by the profession in America—but by the American colleges themselves. American dentists had felt the blush of shame mount their cheeks, when they were constantly reminded that the degree of D.D.S., the distinctive mark of an American dentist, had been openly hawked about Europe *for sale*. The diplomas of the Wisconsin Dental College were offered, even in this country, to any one who would pay for them. And Wisconsin was a regularly chartered school, that conferred degrees "by merit," and not upon any time basis. This was the plea—that of recognising merit—under which all the diploma rascality of America, whether in medical or dental colleges, had been committed. The plea was a very plausible one, but it could be easily seen how it might be, and was, abused.

But it was not the Wisconsin College alone that was the offender. Reputable colleges had engaged in the business of conferring diplomas upon foreign students, after an attendance that was but a mere farce and sham ; upon students who were not even acquainted with the English language, and hence could not comprehend the few lectures that they did attend. Seeing these things, the Dental Society of the State of New York thought it was time that it should put forth the power granted it by the Legislature, and call the colleges to an account, as they were accountable to no other power.

THE DENTAL COSMOS. *(June, PHILADELPHIA.)*

"EXPERIMENTS WITH HYDROCHLORATE OF COCAINE," by Dr. A. Howard Thompson.

"THE CLINICAL SIGNIFICANCE OF RECESSION OF THE GUM," by Dr. Harrison Allen, M.D. It would appear to be more than a coincidence that in all the five cases, which includes the entire number of examples of recession of the gum which have come under my notice, some constitutional depressing condition existed. The list embraces one case of syphilis or gout ; three of spermatorrhea, and one of lupus. So far as I know the association of pyorrhœa with any of these affections has never been noted. That all these patients should have had catarrh or troubles referable to the pharynx may be a coincidence, yet this is by no means probable. Prof. E. T. Darby has informed the writer that he has in several instances detected the evidences of catarrh in patients reporting to him for treatment of pyorrhœa.

The association of catarrhal states with recession of the gums would point to the conclusion that such catarrhal disposition would be atrophic in character rather than hypertrophic, and would lead the observer further to the conclusion that a disposition to atrophy of the gum need not be a local dyscrasia, but may be simply the most superficial lesion of a group of lesions which may be spread over the mucous membrane of both nasal chambers and even of the throat.

"REDUCTION OF FRACTURE OF LOWER MAXILLA—APPLIANCES," by Dr. John H. Meyer. This article is illustrated and was the subject of a paper read before the Brooklyn Dental Society, on February 9.

"CLASP AND BAND MATRICES," by Dr. J. A. Woodward. The writer gives a description of the preparation of these matrices, the article being illustrated.

The report of the March meeting of the NEW YORK ODONTOLOGICAL SOCIETY contains reference to Abrasion ; to the Value of Screw and Elastic Appliances for Regulating Teeth ; to Disease of the Nose from Injury to a Tooth ; and to cases of Threatened Mania from Retarded Wisdom Teeth.

OHIO STATE JOURNAL OF DENTAL SCIENCE. *(June, TOLEDO.)*

"PYORRHŒA ALVEOLARIS," by Dr. A. O. Rawls, is the subject of a paper read before the Mississippi Valley Association of Dental Surgeons, in March last. The discussion upon it is also published.

At the same meeting, Dr. McKellops said that Dr. Morrison, of St. Louis, had a patient, a lady from Ohio, with a loose lower cuspid and a missing upper incisor. Dr. Morrison removed the lower cuspid, dressed it up to resemble a superior incisor, with the dental engine cut a socket for it in the process, inserted the tooth, and it is a success. Has been in about six months.

Bridge-work was also a subject of discussion.

THE SOUTHERN DENTAL JOURNAL. *(June, ATALANTA.)*

This number contains a report of the annual meeting of the Georgia Dental Society, held on May 13th, together with the address by the President, and a paper on "RIGGS' DISEASE," by Dr. R. B. Adair.

"THE RECKLESS SACRIFICE OF TOOTH SUBSTANCE IN DEVITALIZED TEETH" was the subject of a paper read before the Southern Dental Association last April by Dr. W. N. Morrison. The writer, in conclusion, says:—"In all my operations I endeavour to accommodate the instrument to the case, instead of cutting valuable tooth substance to suit bungling instruments. In lateral incisors, for instance, where a dead pulp is diagonised, I drill an opening exactly on a line with the pulp canal that will just admit the size of wire that I use for such canals, and no larger."

Another paper, read by Dr. B. H. Catching, is upon "LITERATURE, AND A PROPHECY." The literature of a profession also gives reputation to that profession, and increases its usefulness. It places a stamp upon every mind, and casts the mould in which every character is formed. It is the only true index of merit, and by it we are judged. It is a guide to success, and the developer of liberty; a destroyer of form, and a terror to empiricism; a panorama revealing the past, improved by the present, to be perfected in the future. It possesses charms only revealed by association, an influence only acquired by familiarity. Intercourse with it is elevating, ignorance of it is degrading. Refinement is coupled with elegance through its teachings. Education is acquired only through its mastery. Success is gained only through its study. It is a perpetual teacher, never graduating its pupils, but constantly adding to the course. And yet ages have come and gone, and there are still those who fail to acknowledge its power; who make no effort to familiarize themselves with it, or to avail themselves of its benefits. He who lays down his text-books with the idea that his education is finished, and fully satisfied with his own accomplishments, is but folding a bandage over his eyes that will cause him to stagger and stumble and fall. He binds himself with fetters that will prevent any further progress; he counts his miles backwards.

Standard works on nearly every subject are before us, some of recent date that bid fair to increase an interest in a field which has been too much neglected; and one the cultivation of which is of great importance to a true professional standing. I allude to Materia Medica and Therapeutics. While literature on practical subjects has been well and ably supplied, this field has been comparatively neglected. The profession at large is lamentably ignorant on these very important subjects. By inspecting the medicine cabinet of the average dentist, you can read his ability in the matter. Creosote and carbolic acid, tanin and arsenic, are the sum total of his capacity to master this subject. Are they to blame altogether? We think not. The means for acquiring broader information was not placed before them; literature on this topic was not of an inviting kind. Colleges failed to instruct, preferring rather to let students display their handiwork as artisans than their ability as therapeutists. It is folly for each one to endeavour to work out for himself truths set forth so clearly by the ablest minds. The masters in literature must lead, and he who fails to follow can only be a laggard.

We must sever the last link that binds us to older times and methods, and introduce a medium of weekly communication. Yes, we must have a weekly dental journal, the coming of which is inevitable and sure. And it must come from the profession, by the profession, for the profession.

AT the April meeting of the New York Odontological Society, Dr. Clowes read a paper on "SEPARATIONS," in which he made allusion to a recent visit from a gentleman who had been his patient for thirty-five years, and who thanked the doctor for having filed his teeth apart many years ago, feeling convinced that but for the separation then made, his teeth would not have been so well preserved. Approximal decay had found no place to lurk, and plenty of room had been afforded to keep all the surfaces clean. Dr. Clowes referred to a paper on the same subject, which he read before the Odontological Society on a previous occasion, and which provoked sharp, adverse criticism, and an emphatic protest against such practice on the part of one gentleman in particular, who was considered an authority in his profession. This gentleman had spoken of the annoyances experienced from such separations, and the difficulty in mastication which it caused. He also stated that he had been called upon to restore, by contour fillings, teeth so cut away. "His harangue," said Dr. Clowes, "seemed to have a marked effect on his hearers, who possibly felt that to cut away teeth would greatly wrong their patients." A venerable friend, however, who happened to be present on that occasion, defended Dr. Clowes' practice, and alluded to the fact that the South Sea Islanders were in the habit of filing the approximal surfaces of their teeth, and with no apparent injury.

Dr. Clowes had practised his method of separation for many years, and had never as yet received a complaint from any one so treated, yet he felt sure that his patients would not hesitate to make complaints if there was occasion for it. The doctor referred to "the approximal arch and lingual bevel" as a sure safeguard against approximal decay.

An editorial article treats upon "OBJECTIONABLE TERMS." If dentists expect to receive any consideration as scientific, or professional, or educated men, they should exercise greater care in the use of technical terms, than is too often done. What impression must be left upon the mind of one who has been trained to professional exactness, when he hears those who lay claim to professional knowledge call the pulp of a tooth "the nerve." To any one who knows the character of nerve tissue, it conveys the impression of dense ignorance when a dentist speaks of "the bleeding nerve." To say that "the nerve was exposed" is absurd. When one says that he saw "the nerve in the tooth," he simply makes himself ridiculous, for no one ever did that without a microscope. The PULP is composed mainly of connective tissue, but it *contains* blood-vessels and nerve filaments, and it is the pulp that is referred to when dentists speak of "the nerve of a tooth."

Another gross error is the calling the first permanent molar "the sixth year molar," or more commonly "the six year old molar." The expression is extremely discordant, unscientific, and incorrect. There is a grave grammatical error in employing it as it is commonly used, one that is so egregious that no man possessed of even a common school education would commit it, except from the force of habit, or through inexcusable carelessness. Why will not dentists cultivate correct speech, and use language worthy professional men, calling the organs which it is their special province to treat by their proper names, as first, second, and third permanent, or deciduous

THE ARCHIVES OF DENTISTRY. *(May, ST. LOUIS.)*

"DEATH FROM INHALING NITROUS OXIDE." Dr. A. J. Shurtleff, a dentist practising in Naitch, Mass., and having an office also in Boston, at the Hotel Roylston, was found dead in his Boston office on the evening of February 26th, under circumstances which show that his death was caused by inhaling that form of nitrous oxide known as "Mayo's Vegetable Anæsthetic," which we have been informed is simply nitrous oxide that has been washed through some solution of vegetable compounds.

The janitor of the building upon being informed by the night watchman that Dr. S. had not gone out of his office, at about 10 o'clock p.m. entered the room and found the doctor lying upon the floor dead. The gas cylinder was lying upon the floor close by his head, completely empty of gas; the tube, detached from the inhaler, was held in the left hand, with one end of it held tightly between the teeth, the other of course attached to the cylinder. The right hand held the wheel wrench, close to, but disconnected from, the cylinder. The face of the deceased was very much discoloured, but the body was not cold. The physician summoned expressed the opinion that life had been extinct for about an hour. The last time the doctor was seen alive was about 6 o'clock, when the janitor opened the office door and found a gentleman friend with him. That friend says that at about 5 o'clock he, at the doctor's request, gave him a little gas, the doctor telling him how to do it. This friend went away soon after 6 o'clock, and left the doctor, as he says, all right. It is not supposed that it was a case of suicide, as there is no known reason for such a theory. The doctor had been complaining of a toothache during the day, but it is not probable he took gas for that reason. Once, weeks before, the janitor had entered the office and found the doctor in his operating chair and in the act of giving himself gas. As the doctor was at times addicted to the too free use of spirituous liquors, the more probable theory is that he took the gas when not in just the condition of mind to judge rightly in regard to it, and died as the result of carelessness on his own part in taking the gas for the pleasurable sensation it gave him. When found by the janitor in the act of giving himself gas he was slightly under the influence of something besides gas, and there is every reason to believe he had "been taking something previous" to the fatal attempt to administer gas to himself. No dentist should ever undertake to administer an anæsthetic to himself under any circumstances. The writer once found a Dental student in an anæsthetized condition with the inhaler still in his mouth and the gas turned on, and in all probability in a few minutes more death would have been the result of that student's experiment with gas "to see what it was like." There are many cases on record of persons dying from the attempt to put themselves to sleep with chloroform. Dr. Shurtleff was about 40 years old, and had been in practice nearly 20 years, and was considered a good and successful practitioner.

EXAMINATION QUESTIONS.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The following questions were given at the written Examination for the Diploma in Dental Surgery on June 22nd:—

ANATOMY AND PHYSIOLOGY.

1. Describe the Temporo-Maxillary Joint and its movements.

2. Explain the action of the Muscles of the Fauces, Palate, and Pharynx during the act of Deglutition.

SURGERY AND PATHOLOGY.

1. How does Syphilis affect the Mouth and Throat?

2. Give the symptoms of a Foreign Body in the Air-passages, and the treatment you would pursue.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Describe the Dentition of Elephants. What constitutes the peculiarities of their Molars, and what differences exist between the tusks of different species and of different individuals of the same species?

2. Give the Chemical Composition and Physiological Action of Saliva. Name the Glands from which this fluid is derived, and the channels by which it is conveyed into the mouth. How is this secretion regulated?

3. Describe minutely the Structures seen in a vertical section of the Lower Jaw, made through the second Temporary Molar, in a child aged eight years.

DENTAL SURGERY AND PATHOLOGY.

1. Enumerate some of the causes which tend to twist Incisor Teeth on their Axes. Describe the Methods of remedying this deformity. Under what circumstances is immediate Torsion admissible?

2. What Organisms are abundant in the Mouth? What share do they take in the process of Dental Caries and in other diseases of the Mouth?

3. What Changes may take place in the Roots of Teeth after their completion? How far can they be diagnosed, and what are the prospects of their successful treatment?

PASS LIST.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

DENTAL Examination, 22nd, 23rd and 24th June, 1885:—Paul Charles Albert Bardet, Geneva; George Goring Campion, Manchester; Walter Joseph England, Hampstead; Frank Hampton Goffe, Birmingham; Alexander John Jones, Maida Vale; George Henry Mugford, Exeter; Frederick Snell Peall, Brixton Rise; Arthur Bernard Robinson, Liverpool; Charles Robert Smith, Leamington; Hugh Lloyd Williams, Llanberis; William Maurice Gabriel (M.R.C.S., 1884), Gloucester Gardens; Alfred Sextus Mackrell (M.R.C.S., 1884), Queen Anne Street. Four candidates were referred to their studies.

CORRESPONDENCE.

VICTORIA DENTAL HOSPITAL.

To the Editor of the DENTAL RECORD.

SIR,—I have read with much interest Mr. Johnson's letter, which appears in the *Dental Record* for this month, in reply to one written by a late member of the Liverpool Dental staff. A very similar state of affairs exists in Manchester at the present time, viz.:—The Dental staff of the Victoria Dental Hospital arrogating to themselves the power of selecting those Dental surgeons who shall serve on the staff, and then submitting the names (which is simply a matter of form) to the Managing Committee for confirmation; so that every resident Dentist, however eligible socially or professionally, is debarred from assisting the Institution and its good work, if his name is not favourably entertained by the four consultants ; so that, in fact, they are the "bosses" of the Institution. One gentleman whose social and professional position is beyond question, and who was largely instrumental in the establishment of the Dental Hospital in Manchester, has quietly retired, for the sake of peace and welfare of the Institution, on his hearing that these few Dental practitioners had formed a *ring* to oppose everything he did for the advancement of his profession,—they putting, *of course*, their own construction as to his motives, &c.

This is a most lamentable state of affairs, especially amongst those who wish to be looked upon as gentlemen and men of education ; but so it is.

Two gentlemen, some short time since, holding good qualifications, offered their services to the Institution, in reply to an advertisement in our daily papers, and they were quietly shelved through personal feelings by these very gentlemen I have already referred to, and the result is, that although we have many eminently qualified men, residents in Manchester, who are ever ready to assist in any good work (if asked), the Committee of Management have lately been obliged to accept the services of gentlemen who live some considerable distance out of Manchester, and also some without any Dental or Medical qualification, because they are recommended by the Dental Committee, and the other eligible resident Dentists of Manchester passed over. How long this state of affairs will be allowed to exist, time will show. I, for one, believe it to be most injurious, and sincerely hope that the Managing Committee of the Victoria Dental Hospital will, at no distant date, adopt the same decided course of conduct as the Managing Committee of the Liverpool Dental Hospital have done in stamping out, to say the least, this unprofessional conduct.

Believe me, yours faithfully,

WILLIAM BURLEY.

Moss Side, Manchester, June 10, 1885.

GOSSIP.

MR. MORGAN HUGHES, L.D.S.Eng., has been appointed Dental Surgeon to the Croydon General Infirmary.

MR. W. F. RICHARDS, L.D.S.Eng., has been appointed Dental Surgeon to the Birmingham Dental Hospital.

MONTHLY REPORT of cases treated at the Birmingham Dental Hospital during the month of May, 1885:—Extractions, 709; gold fillings, 3; other fillings, 136; miscellaneous, 22; anæsthetics, 11; total, 881.

ONE of the most attractive objects at the Nice Exhibition is said to be a Chinese clock, which is stated to date back to 800 B.C.

THE following formula for a foaming tooth-wash was given in *The Chemist and Druggist Diary*, 1884 :—

	Oz.
Quillaia Bark, in coarse powder	4
Glycerine	3
Rectified Spirit	5
Water	30

Macerate for seven days, and filter through 2 drachms of magnes. carb. with which have been mixed oil of wintergreen 20 drops, and oils of neroli and cloves 4 drops each. Finally, add 1 drachm each of benzoic acid and tincture of pellitory ; colour with cochineal or saffron.

THE *Journal of Microscopy and Natural Science* still maintains the position it at once took three years ago. Indeed, so great has been the demand for the first volume, that additional copies have been printed. It is also the journal of the *Postal Microscopical Society.* The society was formed in 1873 to aid in the study, discussion, and circulation of microscopic objects, and to advance the pursuit of natural science among its members. It is divided into thirteen circuits of about twelve members each, arranged geographically. A box of slides, accompanied by MS. book for the insertion of notes and memoranda, is sent by the Hon. Secretary at fortnightly intervals to the first member on one of the circuits, who, after keeping it for three days, must send it on by post to the next on the list, and he to the following one. When it has gone round the circuit, the last member returns it to the Hon. Secretary, who will then forward it to the first member of the next circuit, and so on, until the slides have been seen by the whole of the Society. Each member is expected to contribute six slides annually, which are returned to him after they have been round the circuits. Ladies, as well as gentlemen, may be elected members of the Society. A special section has lately been formed for members of the medical profession. The advantages of this Society have been recognised by its marked success.

MR. GEORGE NORMAN, M.R.C.S., &c., contributes a paper to the *Journal of Microscopy* on certain fungi—"Cystopus." The writer says that the arrangement of Fungi suggested by Sachs and Cohn (see *Dental Record*, Vol. III.), is one of the best known attempts at a scientific classification. They proposed the division of Fungi into four classes, namely—PROTOPHYTA, ZYGOSPOREÆ, OOSPOREÆ and CARPOSPOREÆ. The first class, PROTOPHYTA, contains those simple forms called *Saccharomycetes*, or yeast fungi, and *Schizomycetes*, or bacteria, &c. No sexual organs are found here, and even no non-sexual organs, the multiplication of individuals being effected by the fission or separation of the ordinary vegetative cells. The ZYGOSPOREÆ contains all these fungi in which sexual reproduction takes place by means of conjugation, the essential characteristics of the process being that the two cells which take part in it are alike.

"WHAT IS A PLANT?" is the title of an article by Mr. H. W. S. Worsley-Benison, F.L.S., also published in *The Journal of Microscopy*. He says protoplasm in animal and plant is absolutely identical. The contractility in that of a plant can in no way be distinguished from the contractility in that of an animal. Furthermore, Dr. Burdon-Sanderson, in 1873, at Darwin's suggestion, undertook some experiments on contractility, as seen in the protoplasm of our old friend, *Dionæa*. He found this to be accompanied by an "*electrical disturbance*," precisely similar to that taking place when a human muscle, such as the "biceps," contracts, as in bending the arm. Among plants, we find numerous cases of protoplasmic contractility ensuing as a result of stimuli of various kinds, analogous to that taking place by the agency of nervous tissue.

MR. H. W. S. WORSLEY-BENISON says that physiologically the most distinctive feature of plant-life is the power to manufacture protein from less complex bodies; that of animal-life, the absence of such power. Yet we are compelled to admit that in many cases the difference is one of degree rather than of kind, and that to the question, *Is this an animal or a plant?* we must often reply, *We do not know!*

THE phenomenon of overland migration of eels and other fishes is not uncommon. In the marshes of Picardy and in the woods of Vincennes, eels are often found on the grass going from one pond to another.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, from May 1st to May 31st, 1885:—

		National.	London.
Number of Patients attended		1,566	—
Extractions	Children under 14	447	499
	Adults	532	866
	Under Nitrous Oxide	442	540
Gold Stoppings		84	278
Other Stoppings		651	796
Advice and Scaling		294	144
Irregularities of the Teeth		285	125
Miscellaneous		144	141
Total		2,879	3,389

AT an ordinary meeting of the Edinburgh Dental Students' Society, held on Monday evening, June 7th, the following gentlemen were elected officers and councillors for the Session 1885-6:—Honorary President, W. Bowman Macleod, L.D.S.Edin.; President, Edwin A. Cormack, L.R.C.P. & S., L.D.S.Edin.; Vice-President, J. Stewart Durward, L.D.S.Edin.; Treasurer, William Wilson, M.B., C.M., L.D.S.Edin.; Secretary, Frederick Page; Councillors, James Leslie Fraser, L.D.S.Edin.; E. Percy Rose; David Thomson; David A. Cormack.

AT a meeting of the Council of Queen's College, Birmingham, held on June 18th, Mr. Charles Sims, L.D.S.Eng., Senior Dental Surgeon to the Dental Hospital, and late Lecturer on Dental Mechanics, was elected Professor of Dental Surgery.

MR. W. T. ELLIOTT, L.D.S.Edin.&I., has been appointed Lecturer on Dental Mechanics in the Dental Department of Queen's College, Birmingham.

PROF. MARSH, in his recently published monograph on the extinct order *Dinocerata*, believes that from some primitive form of generalised type, probably small in size, resembling generally an insectivore, and going back at least as far as Permian time, all the mammalian tribes have descended.

THE

DENTAL RECORD.

VOL. V. AUGUST 1, 1885. No. 8.

SOME NERVOUS AFFECTIONS OF DENTAL ORIGIN.

A Paper read before the Students' Society of the National Dental College.

BY HENRY J. KLUHT, L.D.S.Glas.

NERVOUS affections, incident to an abnormal and diseased state of the teeth, comprise a somewhat large and varied class, and the subject admits of much more extended and careful treatment than is possible in the short paper expected from your reader this evening. It may, however, not be unprofitable if we attempt a consideration of our subject in two main particulars :—First, as to the *agencies* likely to lead to remote and complicated trouble from the nervous connections of the teeth with more important structures ; and then direct our attention briefly to some manifestations of this vital connection, when disease disturbs the equilibrium of natural powers.

The teeth, together with their periosteal, alveolar and surrounding structures, receive their nerve forces from branches of the fifth pair of cranial nerves, and a careful study of the course and distribution of these nerves, together with their physiological nature and function, their intimate relations with other of the cranial nerves and the sympathetic system, lead us to understand much which arises when pathological conditions are set up from the dental centres ; and, on the other hand, there is cause for surprise that this important sympathy and union has so often been quite overlooked in the diagnosis of disease.

Unquestionably medical science owes not a little to dental surgeons who have been the means of clearing up many obscure cases of reflex trouble from diseased teeth, and in *emphasising* the extreme importance of sound teeth in the animal economy. In the words of Salter—" The situation of the teeth, their abundant nerve supply; and the great and diffuse swelling which their diseases produce in contiguous structures, inevitably involve much nervous disturbance and complication. The lower molars are but little removed from the tonsils and Eustachian tube, from the parotid gland and external auditory passage. The fangs of the upper back teeth are close to the orbit and its all important contents, and more posteriorly they approach the spheno-maxillary fossa and fissure." "Thus," he says, "it is easy to understand the nervous complications which are directly involved by the spread of inflammation from bad teeth." The physiological character of the fifth nerve is of extreme importance; its sensory and motor functions, together with its intimate relations with the various sympathetic ganglia necessarily comprise a train of vital phenomena the import of which it were impossible to over-estimate.

It is therefore incumbent upon us that we should have very carefully mapped out in our mind the minute distribution of these nervous channels, so that we may be able to intelligently appreciate the relative value of all sensations and appearances, and thus be enabled to decide how far, and in what degree, our services may be required, and likewise, which is not of less importance, how to pass our patients over to treatment of a more general character.

The study of reflex nervous action is fraught with extreme interest and opens up a wide field for patient research, and only he can safely and widely heal disease who aims at clear appreciation of the scope included in the many phases of an organic whole, when such is subjected to a disturbed balance of natural functions. But while we may often be made aware of evidence leading us to conclude an association of dental disease with remote lesions, we are, nevertheless, unable to *explain* the agencies involved in such a result, and much remains to be known before cause and effect lie before us in clear outline. Too much stress cannot be laid upon careful clinical observation, and success often turns upon the acuteness with which this method is followed.

"Irritation in a nerve, or pressure upon a nerve, is sufficient to lead to more or less change in function or structure, and morbid influences may alter a tissue, inducing a deterioration, resulting in, or sufficient to produce, very considerable morbid changes."

For convenience sake we will take some nervous affections which may be considered as of a reflex and remote character, and then some which are more or less of a close and direct kind—a division very mechanical and hardly borne out in the exact study of our subject.

Amongst REFLEX disturbances will rank neuralgia, paralysis, trismus, epilepsy, some eye and ear affections; while amongst those of direct disturbance some forms of facial paralysis and some forms of amaurosis. Pain is a phenomenon of many of these diseases but by no means *always* present; and besides this element there are muscular spasms, muscular paralysis, paralysis of some of the nerves of special sense, perverted nutrition with its attendant sequelæ, &c.

The diseases of the teeth giving rise to these affections comprise nearly all that we have brought under our notice: such as caries, exostosis, nodular developments of dentine within the pulp, periosteal inflammation, impaction of permanent teeth, crowding of the teeth in the dental arch, &c.

By far the most common complaint in our first division is *neuralgia*, upon which subject much has been written and much is known; but it is yet a disease which baffles the most distinguished physicians, and judging from its prevalence, its great severity, and at times its very extraordinary manifestations, it is one which will amply repay very extended research.

The great spread of *caries* amongst civilized peoples opens up immense possibilities of neuralgias, and the two will always be associated together; but when this intimate relationship is more fully known by the public in general—which is very far from the case at the present—we shall then hope that neuralgia from decayed and diseased teeth may be very greatly brought under control, while, on the other hand, patients will not be kept under medical treatment for months, as is yet not rare, when one visit to the dentist might at *once* and *entirely* cure the sufferer.

Take a typical case. A lady, thirty years of age, was sent to a medical man in town, suffering from acute neuralgia, affecting the whole of the left side of the face and head and the left eye. She had suffered almost continually, says the writer, *for ten years*, and no drugs had given much relief. The iris of the affected eye had completely changed colour, showing the severity of the reflex irritation. The patient was passed on to Mr. Salter, and a carious tooth was found to be present, which was removed, and the patient, who suffered much from the operation, was speedily completely cured of the pain. Subsequently it seems there was a recurrence of the symptoms, and another decayed tooth was found. This was extracted, and relief again followed. There seems to be present in some persons an extreme liability to neuralgia—what may safely be called a *neuralgic diathesis*—the slightest cause serving to develop symptoms; while others may be under similar diseased conditions and be quite free, but even in these cases *exhaustion* and *debility* will be liable to induce neuralgia. The diurnal variations, so associated with this complaint, seem to be owing, according to Hilton, to recuperative nerve force by rest and food, and its exhaustion by work and mental strain generally.

A very severe case of tetanus is narrated by Tomes, in which a gentleman during his wedding journey fractured one of his central incisors, and wishing to keep it secret, repaired to some dentist in Paris to have a pivot inserted, which was done. Subsequently severe nervous irritation was set up, leading to trismus, which was followed by tetanus, and death resulted from exhaustion. Doubtless this is an extreme case, associated with peculiar circumstances in the patient himself; but it exemplifies in a forcible manner to what extent nervous irritation from a simple cause—an inflamed pulp in this case—may induce grave and even fatal results.

Until somewhat recently, *epilepsy* was not considered as likely to result from dental disease, but the matter has now, I think, passed beyond the region of reasonable doubt, and is pretty generally recognised as a *possible* cause by writers on the subject.

A boy suffered from epilepsy for eighteen months, and his mother had begun to notice that the child had very frequently, previous to an attack, rubbed his left cheek, complaining of face-ache. Examination of the mouth revealed a badly decayed molar tooth, very tender to the touch and not productive of *pain* so much as great *uneasiness*,—and we may remark incidentally that this uneasiness is often an important *diagnostic symptom* on occasions when pain cannot be said to be present at all. Stress, therefore, may be well laid on this fact. The attack generally came on in the evening. The tooth was extracted, and there was a complete cessation of the fits. Dr. Buzzard, a physician to the Hospital for Epileptics, cites a case of a boy who suffered from attacks at irregular intervals—corresponding with the irruption of his *permanent teeth*—and he had complete relief for five years nearly, until the third molars appeared, when there was a temporary recurrence of the fits, proving very conclusively, I think, the correlation of dental irritation with epilepsy.

One other case we will take as interesting. A gentleman with no *previous disposition* to this complaint was fitted with some artificial teeth, and subsequently he was seized with fits. Attention was directed to the mouth, owing to the seeming coincidence of his commencing to wear artificial substitutes with the onset of these attacks. Diseased and exostosed roots were discovered, which were suspected, and on their complete removal a return of the nervous affection which had temporarily troubled him never came. Of course, these are exceptional causes of epilepsy, but it is a clear gain to medical science to establish such an *identity* as such cases present, and which suggest so easy and so effectual a cure.

It was at the outset of our remarks pointed out that the *eye* and the *ear* were in close and intimate relation with the nerves supplying the teeth, and this seems, so far as the eye is concerned, to have been long known and recognised, hence the term "eye teeth," as applied to the canines. It will be expected, therefore, that both eye and ear may suffer in dental disease, and this fact has now become established in all treatises on ophthalmic and aural surgery. The increase of dental disease has, of course, opened up a wider field for diseases to these parts, and establishes increased responsibilities both upon the *specialist* and the *general practitioner*.

The eye seems to suffer during the periods of irruption of both temporary and permanent teeth, as well as from caries and other diseases of a dental character. I am not venturing upon giving any complete account of eye disease as affected by the teeth, but will only cite two or three cases, which will serve to illustrate this part of our subject.

Only last week a lady called upon me, suffering from complete blindness of the right eye, the sight having failed her in the space of three days. Mr. Critchett had treated the eye locally a short while, but no relief whatever following, he advised her seeing a dentist; but there was no consciousness on the part of the patient of any mischief whatever in the teeth. I found two very diseased teeth, which were removed, one being evidently in a chronic state of suppuration. I have since heard that there is established a sensation of light and darkness in the affected eye, which Mr.

Critchett thinks points to a gradual return to health, but, from what I can gather on the subject, it is by no means sure that the sight will not be permanently injured by this attack.* Reflex irritation to the eye may begin with a feeling of fatigue only; then, on trying to use the sight, the objects become confused; while continued efforts induce pain, tears, blinking of the eyelids, sometimes ptosis, and, in short, every symptom of strong nerve irritation.

Mr. Hancock gives an interesting instance of a boy losing his sight suddenly in the night. Medical treatment, blisters, &c., were resorted to, but completely *failed* to give any *relief*. The suddenness of the attack seemed to point to some functional disorder, and at last the teeth were suspected as playing a part in the mischief. They were found to be very crowded, not diseased. Two permanent and four temporary teeth were removed, and that same evening light was distinguishable, and in less than a fortnight the patient was discharged cured, no medicine being administered, save two aperients. *Strabismus*, again, is often associated with dental irritation.

Some few words respecting the ear must not be omitted, since this is a part very frequently affected. Much attention has recently been given to these cases. Mr. Hilton narrates a singular instance of a discharge from the ear being caused by the irritation set up from a *decayed tooth*, and he thus argues: "A decayed tooth may be the cause, irritation may be conveyed to the auditory canal, and thus induce this morbid secretion." The tooth was extracted and all symptoms subsided. There is some probability that dental irritation of infancy can cause complete deafness, and hence be a factor in the perpetuation amongst us of *deaf mutes*.

Dr. Lauder Brunton gives an instance of a lady taking his aid suffering from much pain and tenderness in the throat, leading the patient to fear laryngitis. On examination the larynx was found free from inflammation and a decayed tooth was suspected as the cause. Dr. Brunton goes on to say that medical treatment much improved matters, as the patient refused to have the tooth extracted, yet he considered *that* no *proof* that the tooth was *not* the culprit in this case, which is a matter of great interest to us, indicating the importance of our acquaintance with the various phases of dental irritation.

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* Since writing the above, I learn that the patient has recovered her sight almost completely.

Teething is recognised as a frequent cause of paralysis in children, of convulsions, of diarrhœa, and of chorea. The diarrhœa from which children suffer is said to be probably owing to reflex irritation transmitted from the fifth nerve to the vagus by means of its gastric and intestinal branches, and it is probable that dyspepsia is often caused by the same irritation in this reflex way, as well as from other causes more distinctly local, as *defective mastication*, &c.

We must pass on to briefly consider some more direct nervous affections, although, as we said before, this division of the subject is somewhat arbitrary and only employed to indicate a natural division in some cases.

Instances of direct implication of nervous trunks are less common than those of reflex irritation, are often *much more serious*, and are likewise apt to be completely misunderstood, with the danger thereupon of very grave symptoms.

The *portio dura* of the seventh nerve and the nerves entering the orbit are those which suffer *mostly* in this way.

A serious case is narrated in one of the journals, in which complete facial paralysis supervened, with likewise loss of sight of one side, and considerable contortion of the muscles of the face. This case would be one in which there was the direct injury to the part as well as reflex irritation. Facial palsy seemed due to entanglement of the *portio dura* in plastic inflammatory products about the parotid region; the blindness may have been *similarly* produced or due to reflex irritation.

An interesting case is given by Salter, amongst others, of a patient being suddenly seized with severe pain in the region of the eye and left temple. It ceased after a while to be again renewed with greater intensity, especially in the eye, the eye felt *protruded*, and now the patient discovered that his sight had gone on that side. The pain then diminished; at the end of six months it again increased, pus was seen to escape from the lower eyelid, and there was much swelling and unsightly appearance. An oculist was consulted with a view to the *extirpation* of the *globe*, but somehow a tooth was discovered which looked suspicious, although the pain did not seem to be associated *with the tooth*. However, it was extracted, and at the end of the fang was found a splinter of wood, a quarter of an inch long. Some pus escaped from the antrum. *Pain ceased*, and that same evening the eye became sensible of light, vision soon improved, and on the *ninth* day after *extraction* it became perfect, after thirteen months of blindness.

It were not difficult to multiply cases, each of which would in itself afford matter of interest did time allow, but sufficient has been said, I think, to answer the ends I have had before me, which have been these:—

1. To emphasise the importance attached to all cases of irritation, whether of direct or of reflex character.

2. To point out the value of careful and patient clinical observation of all phenomena of disease however widely distributed from the supposed origin of mischief.

3. And lastly, to give us some subject which all members can discuss and upon which they can ponder.

BIOLOGICAL STUDIES ON THE FUNGI OF THE HUMAN MOUTH.

By Prof. W. D. Miller, B.A., D.D.S., Berlin.

(Concluded from page 262).

By use of the methods described, I have isolated twenty-two different fungi from the secretions or deposits of the human mouth, and have endeavoured to determine, as far as possible, their separate peculiarities of growth, physiological action, &c. It will, however, at once suggest itself to every one, that a thorough study of twenty-two different fungi involves an enormous amount of labour, and might constitute almost a life task for one experimenter. The task is, moreover, rendered still more difficult by reason of the fact that many of these fungi show differences of action when cultivated in diffierent media, rendering the number of experiments necessary to come to a definite conclusion doubly great. I shall therefore, not attempt to present an exhaustive treatment of the subject, but rather an introduction, hoping, at the same time, to establish some points which may be of use in bringing about a clearer understanding of the factors involved in the production of dental caries.

Regarding the first point to be considered—the morphology of the fungi—it is not at all necessary to enter into a minute description of all the different forms here presented. The figures wilgive a sufficiently clear idea of their diversity, and the appearance of their colonies under a low power. For the rest, suffice it to say that ten of them are micro or diplococci, five are bacteria, and six bacilli. Some show more than one form of development. It would, however, lead us too far from our subject to discuss this fact here.

In liquid media, three grow out into long leptothrix, forming bundles or meshes of intertwining uni or multicelluar threads, while one develops into spirilli ; eight are motile, fourteen are non-motile, while three only have been seen to form spores. The others multiply by division alone.

With reference to the latter point, however, I have not made examinations sufficiently careful or extensive to be able to speak decidedly. Eight liquify nutritive gelatine, one converts it into a paste, thirteeen leave it unchanged. On agar-agar, the differences of growth are not sufficiently pronounced to deserve particular mention. In gelatine, the microscopic appearance of the colonies of a sufficient number of these fungi is shown in the figures (b). It will be seen that the appearance of the colonies forms a much safer means of differentiation than the morphological characteristics of the fungi, it being very seldom that, in growing, two fungi present exactly the same appearance. An exception is, however, presented by 6 and 7, which to the naked eye and under the microscope grow on gelatine exactly alike ; moreover, on potato, white of egg, blood-serum, agar-agar and milk, their effect is identical. One, however, produces a yellow colouring matter, the other not, and thereby they are easily distinguished. The others may all be readily distinguished by their growth on potato.

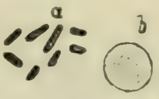

Fig. 1.

In relation to oxygen they show great differences. Ten are strictly aerobian, *i.e.*, they grow only where the air has free access. Four are not strictly aerobian, *i.e.*, they propagate also when the atmospheric air is excluded, though not so rapidly. Eight grow equally well with or without access of air. Sixteen produce an acid reaction in a solution of beef extract, peptone and sugar. Four produce an alkaline reaction without the appearance of bad smelling products, and appear to leave the solution neutral. With regard to the six, however, the results were not satisfactory, sometimes

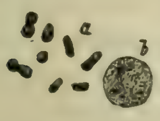

Fig. 2.

the reaction being acid, at other times neutral or alkaline depending somewhat upon the material used for the cultures.

Some which produce an acid reaction in fermentable solutions, give rise to an alkaline reaction in non-fermentable solutions. The acid produced is probably, in all, or in nearly all these cases, lactic acid. This fact I established for No. 1 by chemical analysis, for No. 2 by forming the zinc salt and crystallizing, for No. 5 by the colour test.* In the other cases the acid was not determined. Thirteen were repeatedly cultivated on potato. Of these, five grew rapidly, one in particular covering the whole surface of the section in forty-eight hours, and completely liquifying it to a depth of one to two mm., the liquified mass flowing off at the sides; the others develop very slowly, and attain only a limited growth. I am not able to say whether any of them possesses a diastatic action. It is, however, highly probable. Fifteen were cultivated on boiled white of egg. Four grew very rapidly, No. 19 (see Fig. 13) in particular, in from two to four days, converting the egg into a semi-transparent, pasty mass, which gradually disappeared. In the first two days large quantities of sulphuretted hydrogen are developed; later, ammonia. Seven grew slowly on the white of egg, and four scarcely at all. The nourishment of the fungi naturally takes place at the expense of the albumen of the egg, which is converted into a soluble variety by the peptonizing action of the fungus. In two cases the presence of peptone could be detected in the dissolved mass after separation from the albumen, by the biuret reaction, the organisms producing more peptone than they needed for their own consumption.

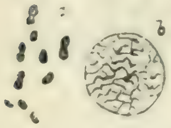
Fig. 3

Some of them produce in fermentable solutions considerable quantities of gas. If a glass bulb, with a fine stem drawn out to a point, be filled with milk inoculated with No. 3 (see Fig. 2), otherwise sterile, and kept at blood temperature, in twenty-four hours so much gas

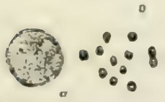
Fig. 4

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* Two drops carbolic acid, one drop chloride of iron, twenty ccm. water, produce a violet colour which becomes yellow on the addition of lactic acid, even in very dilute form. I am not prepared to say that this is an absolutely sure test for lactic acid. It is the test used by Prof. Ewald and others, for detecting lactic acid in the stomach, and is considered by them to be decisive. Of course the culture material itself must not give this reaction. Beef extract, for example, cannot be used, as it already contains lactic acid. A few other substances also give this reaction, but none, I believe, which are likely to be produced in these cultures.

will be generated that on breaking off the point the whole contents of the bulb will be ejected with considerable force. The same effect may sometimes be produced, though not so markedly, when nonfermentable solutions are used. We may expect a similar action to take place when we seal up a dead pulp in a tooth, not only the gas itself escaping through the apical foramen, but, if its exit is hindered, ultimately forcing particles of the decomposing pulp through with it. The question suggests itself, whether certain configurations seen in carious dentine may not owe their origin in part to the pressure of gas.

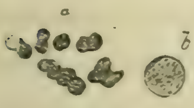

Fig. 5.

Four produce colouring matter, Nos. 5 and 7 (Figures 4 and 5), in gelatine cultures some days old, forming brick-yellow masses, such as may be seen occasionally on the buccal surface of teeth which are not kept well cleaned.

On potato they appear bright yellow. Nos. 10 and 13 give the gelatine for a space one cm. in diameter around the colony, a grass-green tinge. I doubt very much whether either of these organisms has anything to do with the production of green stain, all my attempts to isolate a chromogenic fungus directly from green stain having thus far failed. Cultures of some of these fungi were made on dentine and enamel. Sections of dentine, when decalcified neutralized and soaked in saliva and sugar, formed, when kept in a perfect damp cell, a medium on which a considerable development took place, microtome sections of the dentine after two weeks showing a destruction of substance at the point of inoculation.

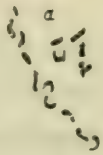

Fig. 6.

On sections of normal dentine, the fungi in some cases appeared to maintain an existence until the organic matter exposed upon the surface of the section was consumed, after which the development ceased, while normal enamel, as might have been expected, formed about as good a culture substratum as glass or porcelain.

A description of the cultures in milk, blood-serum, &c., is not necessary for our present purpose. Also, experiments on animals have been made in too limited a number to lead to accurate results. It is very plain, however, that a study of the pathogenic character of twenty-two fungi is out of the question. No. 19, which possesses peculiar interest on account of its similarity to the cholera-bacillus, was tested on mice, guinea-pigs and rabbits. A

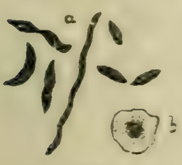

Fig. 7.

small quantity from a pure culture injected into the abdominal cavity of mice, almost invariably caused death in a few hours. Guinea-pigs and rabbits have thus far shown themselves proof against it, even when large quantities were injected into the duodenum (the *ductus choledochus* not being ligated.) Experiments were made with a number of antiseptics, in addition to those reported in this journal (Vol. V. page 283.) Arsenious acid, contrary to the repeated statements of one of our journals, possesses an antiseptic power at least half as great as that of carbolic acid, and about twenty-five times greater than absolute alcohol. Chlorate of potassium, on the other hand, possesses scarcely any available power whatever. Peroxide of hydrogen proved to be particularly active. These experiments are not yet completed, and will therefore be given in a separate paper.

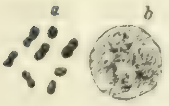

Fig. 8.

The following practical conclusions appear to follow from the experiments above recorded :—

1. A great majority of the fungi found in the human mouth are capable of producing acid from cane or grape sugar, and it is probable that, *with very few exceptions*, all can, when the proper conditions are presented to them. In nearly all cases which have been examined with special reference to this question the acid has appeared to be lactic. The acetic acid fermentation, which cannot go on at temperatures above 35° C, (Fluegge), is out of the question in the human mouth, nor is there, as yet, any proof of the presence of more than minute traces of butyric acid.

2. In non-fermentable substances the reaction will be found either neutral or alkaline, in some cases considerable quantities of ammonia and sulphuretted hydrogen being produced. If, therefore a decomposing pulp is sealed up in a tooth its reaction cannot be acid and caries cannot take place either in the pulp chamber or root canals.

Of considerable interest is the fact that the same fungus may produce an acid reaction in one substratum, and an alkaline in another. If, for example, No. 19 (fig. 13) be cultivated in certain neutral, non-fermentable substances, an alkaline reaction will appear. If, then, sugar be added, the reaction will in a few hours change to acid. In such a case we undoubtedly have

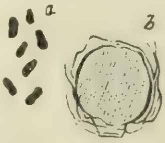

Fig. 9.

two distinct processes going on; first, the nutrition of the organism accompanied by the appearance of alkaline products, and secondly, its fermentive action accompanied by acid products. Ordinarily the latter so outweigh the former that the resultant reaction will be acid. This is, however, by no means necessarily the case. On the other hand, conditions may readily be produced under which the resultant reaction will be neutral or alkaline, especially in the human mouth, where so many different fungi and so various conditions are present. In such a case the result would be to put a temporary check upon the advance of the decalcifying process; in other words, upon the caries itself. In the case of particularly foul-mouthed persons the foulness itself may become a preventive of caries.

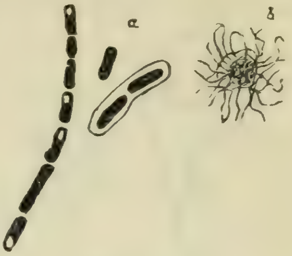

Fig. 10.

4. The possession of a peptonising action by a large number of these fungi readily accounts for the solution of the decalcified dentine.*

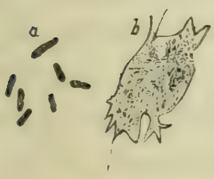

Fig. 11.

5. Any one of these fungi which can produce acid by fermentation of carbohydrates, or can dissolve the decalcified dentine, may aid in the production of caries, while any one which combines both these properties, as many of them do, may alone bring about the phenomenon of dental caries. A solution of the dentine or enamel, without previous decalcification, cannot take place. The fact which I have so often affirmed, and which was denied by Milles and Underwood, that one continually meets with large tracts of softened, non-infected

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* Not a little confusion has been introduced by attempted artificial definitions of putrefication and fermentation. The idea that every change in nitrogenous organic substances must be of the nature of putrefaction is particularly misleading. A ferment of the nature of pepsine, which dissolves coagulated albumen, is widely distributed among the fungi of fermentation as well as putrefaction, and the schizomycetes in general require nitrogenous substances in some shape for their nutrition. The dissolution of the organic portion of dentine is by no means dependent upon the presence of putrefactive organism, but may be accomplished equally well by fermentation. As stated in previous papers, I never found a putrefactive organism in the deeper portions of carious dentine. Moreover, the acid reaction of carious dentine is highly unfavourable to the development of such organisms. I intend to repeat and extend my experiments on this point. The presence of putrefactive organisms, while it would accelerate the second stage of caries, could only retard the first.

dentine, has been completely confirmed by Arkovy and Matrai. They say, "the invasion extends, however, only to a certain depth, and only isolated tubules show a deeper invasion, sometimes to twice the depth, and reach the border of the normal dentine," the whole territory between the isolated tubules being free from invasion.

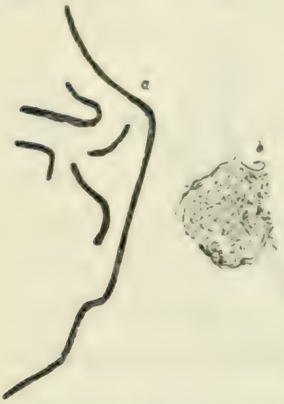

Fig. 12.

6. The comparative or complete independence of many of these organisms of the free access of air, renders their propagation within the dentine, or under fillings where softened, non-sterilized dentine has been left, an easy matter.

7. The fact that dentine and enamel form so exceedingly poor culture substrata for schizomycetes, is an additional proof of the position that their attack upon the teeth is only secondary; *i.e.*, they owe their rapid development to the secretions, deposits, &c., of the oral cavity, and not until the tissue of the tooth has undergone a certain change—first decalcification, second peptonization—can they adapt it to their nourishment. The decalcification is produced chiefly by acid, resulting from the action of the organisms upon certain carbohydrates in the human mouth, while the peptonization is produced either by the direct action of the protoplasm of the organisms upon the decalcified dentine, or by the action of a ferment which they produce.

A knowledge of the properties of the fungi of the human mouth, as given above, combined with a microscopic and chemical examination of carious tissue, and comparative studies of caries of living and dead teeth, appear to me to furnish a fair solution of the phenomena of dental caries. That other agents than those of a parasitic nature are also often concerned, there can be no doubt. To say nothing of predisposing causes, an acid reaction of the oral secretions, acid medicines, acid foods, &c., may give rise to caries at points which otherwise probably would have escaped.

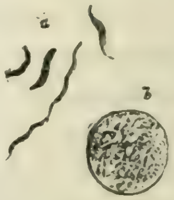

Fig. 13.

NATIONAL DENTAL COLLEGE.

DISTRIBUTION OF PRIZES.

THE Annual Distribution of Prizes took place at the Beethoven Rooms on July 6th, at 8 o'clock, Dr. Alfred Carpenter, J.P., presiding.

The proceedings commenced by the Dean reading the following report:—

Among the events of the past year there is to record the appointment of a Lecturer on Dental *Materia Medica*. Owing to the difficulty of finding a suitable occupant for the chair, the office has been vacant since 1879. By the election of Mr. Charles Glassington we hope to again give an impetus to the study of that important subject, which, as yet, is not included in the requirements of the Dental curriculum.

By the appointment of three additional anæsthetists to the Hospital, making a staff of four, the teaching of the administration of anæsthetics has been placed in most able hands. This addition to the efficiency of the Hospital as well as to the School seems to be appreciated by the poor patients, inasmuch as there was an increase during last year of 1,807 operations under anæsthetics.

The Rymer Gold Medal for General Proficiency has not been awarded this year. This is the first occasion of that much-valued prize being withheld. The Committee trust that their decision will not only advance the value of the medal, but stimulate the non-successful to still greater effort next year.

The Medical Committee have decided upon offering one Free Scholarship annually, tenable for two years, the nomination being at the discretion of the Committee of Management of the Dental Benevolent Fund. It is to provide the Dental education at the National Dental Hospital and College for the son of a deceased, or sick, registered Dental practitioner, whose professional education shall have been commenced prior to such application to the fund.

The several prizes and certificates of honour are this year awarded to a greater number of students than on any previous occasion. It has happened that one student has been the recipient of five or six prizes. On this occasion twelve prizes have been won by ten competitors, Mr. Lombardi carrying off two medals, and Mr. F. Wright, who last year gained five medals, receiving the two prizes of the Students' Society. A prize medal is to be given to Mr. Poole for Dental Mechanics, to Mr. Douthwaite for Dental Surgery, to Mr. Lombardi for Dental Anatomy and for Metallurgy, and to Mr. Perks for Operative Dental Surgery. Certificates of Honour have been awarded to Mr. Lovitt, Mr. Tucker, Mr. Carter, Mr. James Rymer, and Mr. Fisk.

During the year six students have taken the Dental Diploma, and at the present time there are twenty-four students attending the teaching of this Institution—a number quite up to the average.

There is one conclusion, of which there is no uncertainty, that the National Dental College continues to be a successful "School for the instruction of Dentists."

Dr. Carpenter, having presented the prizes, addressed the meeting as follows:—

Ladies and Gentlemen,—It may seem almost presumption on my part to appear before you this evening for the purpose of distributing the prizes to the successful students of the National Dental Hospital and College. If it were not for recollections of former times, I certainly should have hesitated to accept the invitation which your Council forwarded to me to take the chair, and have the pleasure of presenting the prizes. It was the recollection of a meeting which was held twenty-nine years ago in the City of London—a meeting which was the first that was ever convened, which had for its object the bringing together Dentists from all parts of the kingdom, which meeting filled one of the largest rooms at the London Tavern, Gracechurch Street. This meeting was convened by Mr. Lee-Rymer as a sequence to a discussion which had been raised through the medium of the *Lancet* (the medical newspaper), as to the position which the Dentist of that time occupied in the public mind.

The discussion was raised by my friend who convened the meeting I have referred to. He asked me to accompany him to it. After I arrived in the room, the question was raised as to who should be chairman, and the fact that I possessed medical qualifications, and had no ambition as to the matter about to be discussed by the company, led to my being voted to the chair, and gave me a reason for presuming to appear to-night.

The noble position to which the profession of dentistry has at the present time attained may claim its starting point from that meeting.

It had its natural consequences in the formation of the Dental Hospital and College. It assisted in welding together the then existing elements of the Dental profession into one powerful combination, the result of which has been that such an advance has taken place in it that it now occupies as high a position, and in some points even a higher one, than that part of the profession to which I immediately belong ; at the same time, it is not distinct, but is a true branch of the medical profession.

Upon the results which have followed that meeting in Gracechurch Street, and the blessings which it has yielded to humanity in general, I must congratulate my friend, Mr. Rymer, for to him much of it is due.

The position of the Dentist at the date referred to was something like to that of the medical profession at the beginning of this century. There was no kind of practical education or any officially recognised course of study, but "Rymer" seized the opportunity, collected together the scattered members of the Dental profession who were practising without having obtained previously to that time any Dental licence. Had it not been for that gentleman, the probability is that the College of Surgeons would not have made the elaborate arrangement for the Dental Section which is at the present time carried out most advantageously to humanity in general. The Dental profession would, in all probability, have been divided into two distinct sections, surgical and mechanical, had it not been for Mr. Rymer, whose action forced the mechanical along with the surgical, which thus became welded together into one by a common bond of union, resulting in the complete system of education which is carried out at the present day at this hospital and school.

A medical man's education at the present time is somewhat in a state of muddle. Some time ago apprenticeships were abolished, and unfortunately there has not been anything introduced in its place having the advantages which apprenticeship afforded. The Dental, which is really part and parcel of my own profession, has advantages in its apprenticeships, wherein the great art of Dental mechanics is thoroughly learned, the long term of hospital studies moulding the student into a qualified practitioner, but making the Dental education occupy a longer time than that taken up by the ordinary medical practitioner.

We have seen to-day some of those gentlemen who have distinguished themselves in this branch of the medical profession, and it is an extremely important branch, inasmuch as it has to do with the prevention of disease. It is by attention to our masticating organs that evils of indigestion will be prevented, and indigestion is the commencing point for a large mass of functional and organic disease which may be hindered by the dentist's art.

I well recollect the time when I was a medical pupil, forty-five years ago, in a Midland Counties Infirmary Surgery, the way in which I used to pull out teeth by means of a key comes vividly before me. I recollect being occupied for three or four hours on a Sunday morning in pulling out teeth by that barbarous instrument. The people used to flock from miles and miles around to have their teeth extracted more effectually, as they considered, by us than by the village blacksmith, for we charged them nothing at all for our work. I remember well, gentlemen, that we had in a drawer belonging to the Infirmary more than a bushel of teeth which we had extracted from time to time. These are, however, days gone by, and fortunate for humanity such is the case, for I tremble, gentlemen, to think of the amount of indigestion which must have followed our action at that time; but it was then considered to be just the sort of work doctors' pupils should do.

The Dental profession, however, now occupies its proper position in the country, and the coming members should, and undoubtedly will be, gentlemen. The education that the student has to follow out necessarily makes it so if he is to be a successful student and obtain the license necessary to become a qualified practitioner. He also must be more than a gentleman, for he must be an artist. He must attend his College studies and Hospital practice, and he will develop, in the same way as my friend Mr. Rymer has done, in connection with his work; not only occupying a distinguished position in his profession, but by becoming a distinguished member of the municipal authority in the locality in which he resides. I have great pleasure in congratulating him upon what he has attained to in addition to his connection with Dental science, and I think he most heartily deserves the high position he occupies in your College as well as in his own town.

There are a good many important subjects I might refer to in connection with matters relating to your specialty, but I know that the ladies present would not thank me if I were to keep them long from the sweet strains of music which are to follow my remarks. I shall, therefore, detain you but a short time.

I do not think the day will ever come when Parliament will pass an Act making a man liable to prosecution if he pulls out a tooth, neither do I think it desirable, as I think there is a certain amount of liberty as to what a man should be allowed to do for himself. But that will not matter in the least, for I feel quite sure that dentists will occupy such a position in the eyes of the public that no one worth a thought will think of having a tooth extracted except by a dentist. All this will result from the advanced system of education which is being extended all over the country.

Twenty-nine years ago there was nothing like the Dental hospitals and professorships which exist now.

There are at the present time at least two Dental hospitals flourishing in London. There are also a good number in the provinces. Most of the London hospitals have Dental professors attached to their staff. Institutions like yours are doing good work by giving the students not only an education with regard to their specialty but also a scientific education. With these conditions, I am certain that a man having passed through the present curriculum, and having obtained his stamp, by means of a searching examination, which shows him to be of true sterling quality, will never be in the rear rank of any work he may undertake.

To those who are starting in their professional life, and who, of course, intend it to be lucrative to them, I would ask not to make it a matter of filling their pockets only. Five of them have received medals this evening, and if those gentlemen have not obtained their license at the College of Surgeons they intend doing so, and I feel certain that they, and all other gentlemen who mark the action of those who have gone before them, will become useful and distinguished citizens.

The more gentlemen we have amongst us who have distinguished themselves in early life for the purpose of gaining knowledge, after which we all thirst, the better for the world at large. I feel certain that they will never disgrace or forget in any way the profession to which they belong, or forget the honour due which is due to it.

I have great pleasure in congratulating the gentlemen present on the success they have obtained. I have looked through their curriculum, and I am very pleased to see the very thorough way in which it has been carried out. I am also glad to find that the allied sciences are not neglected. These gentlemen are not only making themselves specialists, but are also becoming scientific men; I feel certain that they will never forget the "alma mater" at which their education has been obtained.

Mr. Lee-Rymer said that a glance at the list at the back of their programmes would show that a very distinguished number of gentlemen had presided at their yearly prize distributions, and he thought that the gentleman who had so kindly officiated for them that evening was certainly no exception to the rule. In Dr. Carpenter they had one who had for a very long series of years devoted himself to the great cause of sanitary science and that of preventive medicines. He therefore felt great pleasure in proposing a cordial vote of thanks to their chairman.

Dr. Carpenter having replied, the proceedings terminated with a full programme of music.

DENTAL HOSPITAL OF LONDON.

DISTRIBUTION OF PRIZES.

The Annual Distribution of Prizes to the Students of the London School of Dental Surgery took place at the Hospital on the afternoon of the 24th ult. Sir Risdon Bennett, M.D., F.R.S., &c., occupied the chair.

The Dean, Mr. Morton Smale, read the following Report:—

Sir Risdon Bennett, Ladies and Gentlemen,—My first duty today is to bid you, in the name of the Staff and Students of this Hospital, a hearty welcome. This I do with the utmost pleasure. My second, which is not accompanied by similar feelings, to make a report of the School since last "distribution." This shall be as short as needs be, that you may not be wearied before the gentleman who so kindly consents to take the chair to-day speaks to us.

Last year we were regretting the departure of Mr. Coleman to New Zealand, causing the Lectureship on Dental Surgery to be vacant, a position he had so ably filled for some years. Mr. Hutchinson, who has served the Hospital as Dental Surgeon since 1877, has been elected to fill the vacancy. He has found it necessary to resign his position as a member of the Hospital Staff, which he has with so much credit filled for a period of nine years; but although the Hospital regrets the loss of his services as a surgeon, the School gains by his appointment as lecturer. Mr. Storer Bennett, our Senior Assistant Surgeon, was elected to fill the vacancy caused by Mr. Hutchinson's retirement. Mr. Hern, whose name is so familiar to us all as Saunders Scholar, House Surgeon, and Demonstrator, has been elected to the vacancy on the Junior Staff.

For some years Mr. Ackery has been rendering good service to the School as Demonstrator. He has, unfortunately, found it necessary to sever his official connection with the Hospital, the new arrangements at St. Bartholomew's, where he is Assistant Dental Surgeon (whereby he is required to attend four mornings a week), occupying all the time he can spare from his practice. Mr. Latchmore, who has always had the good of the Hospital at heart, has been elected to fill the vacancy.

Our House Surgeons, Messrs. King, Crocker and C. R. Smith, have devoted themselves with energy to their duties, and carefully filled their respective offices.

The Pass List at the College has been up to the average. At the examinations all the candidates save one on each occasion have been successful, much to the credit of our medical tutor. Six of our Students have passed the primary membership, one the primary fellowship, and an old Student (Mr. Newland Pedley) the final fellowship.

Our new entries are much larger than in any former year, thirty-one new students having joined. Thirteen of these entered this May, and we have a daily attendance of over forty students, so that our present accommodation is rapidly becoming inadequate to the demand.

A word of thanks to the ladies who have honoured us to-day, it is exceedingly good of them to grace our building by their presence and encourage us. Feeling that 5 o'clock was an awkward hour for them, we have provided tea in the adjoining room.

In conclusion, may I be allowed to thank our students thus publicly for their good behaviour and the universal courtesy at all times shown to the members of the staff, and to assure them how great a pleasure it is to us to be of service to them.

That I have so seldom had cause to exercise the judicial authority invested in me, is a cause of great satisfaction to us all.

The following is the list of awards :—*The Saunders' Scholarship*, Mr. C. F. Rilot ; *The Ash's Prize*, Mr. W. J. England ; the essays of Mr. W. M. Gabriel and G. O. Richards are specially commended. WINTER SESSION, 1884-5 :—*Metallurgy*—First Prize, Mr. W. J. England ; Second Prize, Mr. L. E. Sexton ; Hon. Certificates, Mr. C. F. Rilot; Mr. Lloyd Williams; Mr. G. O. Whittaker; Mr. G. O. Richards ; Mr. J. Colyer. *Mechanical Dentistry*—First Prize, Mr. C. F. Rilot ; Second Prize, Mr. F. M. Ludbrook. Hon. Certificates, Mr. C. A. Barstow ; Mr. H. J. Moore. SUMMER SESSION, 1885 :—*Dental Anatomy*—First Prize, Mr. G. Campion ; Second Prize, C. F. Rilot. Hon. Certificates, Mr. L. E. Sexton ; Mr. J. Mansbridge. *Dental Surgery and Pathology*—First Prize, Mr. C. F. Rilot ; Second Prize, Mr. G. O. Whittaker. Hon. Certificates, Mr. L. E. Sexton ; Mr. W. M. Gabriel ; Mr. G. O. Richards ; Mr. T. C. Williams ; Mr. F. M. Ludbrook. *Operating Prize*—First, Mr. C. R. Smith ; Second, Mr. L. Jeffery. Hon. Certificate, Mr. W. J. England.

Sir Risdon Bennett, in briefly addressing the Students, said he presumed it was not expected that he should give anything in the way of a long address to them on such an occasion as the presentation of prizes, but one or two things had occurred to him during the time he had occupied the chair that day which he thought he would just mention. The first had reference to the public and friends who were amongst their number. He thought they, one and all, ought to feel very grateful to those who had been the means of establishing Schools and Institutions similar to the one they were then in. There was no doubt that with the advance of education it would have been almost impossible without such institutions for young men who had served their apprenticeship in Dental Surgery to take their proper position in society which their claim as Dental Surgeons would fully justify. Dental Institutions had a double object, the first being the great means of advancing the education of men in the dental specialty, and the second the exceedingly valuable and charitable relief and assistance, of the best kind, given by the Hospital to the necessitous.

Sir Risdon Bennett said, with reference to the young men present as Students, that he thought it was important for them to remember the words "*Ce n'est que le premier pas qui coûte*,"—meaning that it was the first steps that were the most difficult of attainment, and that the first steps required courage and determination, which it was certain from the evidence before them that such had been manifested. It was very desirable that whatever channel in which it should be their lot to run, those qualities should be called into action; and although it was possible that at the time they would not receive a reward for their perseverance, yet they should press on, self-denying, suffering mental fatigue and disappointment, for the reward which would be sure to come later on, and which would make them look back with pleasure to those old days of toil.

In conclusion, Sir Risdon Bennett congratulated the Students on the success they had obtained, and ventured to say that none of them had cause for disappointment when they had striven hard in the past. They had done well during the past year, and he wished them every success in the coming year.

Sir Charles McGregor, Bart., moved a vote of thanks to Sir Risdon Bennett for presiding, which was seconded by Mr. George Gregson.

Sir Risdon Bennett having briefly replied, the proceedings terminated.

EDINBURGH DENTAL HOSPITAL.

The Directors of the Edinburgh Dental Hospital and School, Chambers Street, held their half-yearly meeting on Tuesday, the 21st July. Dr. Smith, President of the Royal College of Surgeons, presiding.

Mr. William Bowman Macleod, Dean, read the report of the school work for the Session, which showed that the institution continued to prosper, owing to the efficiency of the teaching staff and the diligence of the students themselves. The average attendance has been most satisfactory, and the quantity and quality of the practical work had been exceptionally good. In the medical class (winter session) Mr. J. Leslie Fraser took first place and the silver medal in the class of *materia medica*. In the class of systematic chemistry, certificates were awarded to Messrs. Charles E. Dew (91·6 per cent.), David Thomson (88·6 per cent.), Gordon Shiach (85 per cent.), and E. Percy Rose (81 per cent.). In the special work of hospital practice the senior prize was gained by Mr. Thomas P. Ritchie, Mr. David Browne receiving special commendation. In the junior division Mr. Gordon Shiach took first prize, Mr. E. P. Rose being a good second. In the class of dental anatomy the prize was gained by Mr. J. Leslie Fraser, while Mr. David Browne carried off the prize in the class of dental surgery and dental mechanics. The number of cases treated at the hospital for the quarter ending June 30th, was:—Extractions, 706 males, and 483 females for minor operations. In addition there were 24 major operations under anæsthetics, and 499 stopping cases, 176 being in gold, 174 in alloy, and 149 in cement. The total for the quarter was 1,702, being an increase of about 100.

Dr. Reid then congratulated the students upon the work of the Session, and said the statement showed that much progress was being made in that most useful branch in the preservation of the teeth.

The Chairman afterwards presented the prizes to the successful students. A cordial vote of thanks was awarded Dr. Smith for presiding, after which the meeting terminated.

BRITISH DENTAL ASSOCIATION.

THE ANNUAL GENERAL MEETING AT CAMBRIDGE.

THE Annual General Meeting of the Association will take place at Cambridge on the 27th, 28th and 29th inst.

At 11 am., on the 27th, a General Meeting will be held in the Debating Hall of the Union, when Dr. John Smith will deliver his Valedictory, and Mr. R. White, the new President, will follow with his Inaugural Address, after which the usual business of the Association—reception of reports from Secretary and Treasurer, election of members of the Representative Board, &c.—will be transacted.

Clinics and Demonstrations will be given in the University Museum of Zoology and Comparative Anatomy, and the usual collection of specimens and exhibition of Dental appliances will be open for inspection.

At 8.30 p.m. there will be a Conversazione and Reception of members and friends by the President and Council of the Eastern Counties Branch at St. Peter's College.

On Friday, the General Meeting will be continued at 10 a.m.

For the following list of papers promised, we are indebted to the Hon. Secretary:—

Excision versus Extraction, by Mr. C. Spencer Bate; On First

Permanent Molars, by Mr. R. W. White; Dental Specimens in Cambridge Museum, by Dr. Hans Gadow; Compulsory Attention to the Teeth of School Children, by Mr. W. M. Fisher; Hopes and Fears of Dentistry, by Mr. J. Oakley Coles; Section Cutting of Dental Tissues, by Mr. T. C. White; The Existence of Electric Currents in the Mouth, by Dr. George Cunningham; The Necessity for Teeth after Fifty Years, by Mr. S. J. Hutchinson; Capping versus Extraction of Pulp, by Dr. Walker; Antiseptics in Dental Surgery, by Mr. F. Harrison; Some Points of Interest in Dental Anatomy, by Mr. A. S. Underwood; * * * by Mr. C. S. Tomes.

The following short papers to precede Demonstrations:—

On Cast Metal as a Basis, by Dr. C. M. Cuningham; On Herbst's Method of Gold Filling, by Mr. Storer Bennett; Exhibition of Specimens of Prehistoric Dentistry, by Dr. Waite; On Continuous Gum Facings, by Mr. A. B. Verrier; Bridge-work on Balkwill's Method, by Dr. Macredy.

The following Demonstrations have been promised:—

Herbst's Method of Gold Filling, by Mr. Storer Bennett; Filling by Herbst's Method with the Aid of New Matrix and Clamp of own design, by Mr. George Brunton; Adhesive Gold Filling with Smooth, Round-ended Pluggers, by Mr. F. H. Balkwill; Gold Filling, by Dr. W. St. George Elliott; Gold Filling, by Dr. C. Claude Rogers; Demonstration with Electric Mallet, by Mr. J. J. Andrew; Gold Filling, by Mr. Walter Brown; The Application of Hammond's Wire Splint for Fractured Jaws, by Mr. Newland Pedley; The Attachment of a Ferrule Pivot, by Mr. Alfred Jones, Jun.; The Attachment of a Gold Crown, and a Demonstration on Cast-Metal Plates, by Dr. C. M. Cunningham.

At 4 p.m. on Friday, a Garden Party will be given by the President in the grounds of Downing College; and at 7 p.m. the Annual Dinner will be held in the hall of Caius College.

PREPARING TISSUES FOR MICROSCOPICAL EXAMINATION.

By Frank Harrison, M.R.C.S., L.D.S.Edin.

A Paper read at the Annual Meeting of the Midland Branch of the British Dental Association, at Nottingham, on April 17th, and reprinted from the "Journal."

A slight mistake has occurred in advertising the title of my paper. If I were to discuss the methods of preparing tissues practised by various microscopists, I should have to write a large book instead of a short paper. My intention is to describe a process which I have adopted to demonstrate the phenomena of the development of the teeth, and also to show the minute structure of the soft dental tissues. I know that a lengthy discussion of a scientific subject becomes very tedious, and not calculated to fascinate the busy practitioner or to entice the young one to become a student, and shall therefore endeavour to be as practical as possible.

I have placed under the microscope three objects for your inspection. The first is prepared from a fœtal kitten of about two weeks, the second from an abortive fœtal kitten of about six weeks, and the third from a kitten at birth. These kittens will serve very well as types to illustrate the first step in the process of manipulation.

The youngest—the fœtus of about a fortnight old—was placed directly into a solution of bichromate of potash (one-half per cent.) in order to harden the soft pulpy tissues, and so facilitate the operation of section cutting. The second fœtus and the kitten at birth were submitted to a different process. I placed them in a saturated solution of picric acid, which decalcifies the bone that has been formed in the tissues, and also hardens the soft tissues of which the mass is composed. Before immersion in the softening solution, the subject should be divided into as many small pieces as possible, of course taking care not to injure any tissues which it is wished to examine afterwards, for if the head of a kitten be placed *en masse* in the solution, it is possible that the finer internal structures may have become disintegrated before the solution has had time to penetrate its tissues. When a needle can be passed through the entire mass without encountering any obstacle, we know that complete decalcification has taken place, and that it may be removed from the solution and freely washed. Now that the softening or hardening process, as the case may be, has been arrested by washing, the mass may be put into spirit, which will preserve it for future investigation, or we may proceed at once to the next stage, which consists of immersing the tissue in a solution of gum, to which a little carbolic acid has been added, to prevent the formation of fungous growths. I generally allow a day for the gum to infiltrate itself into the various tissues of which the mass is composed, before proceeding to cut sections from it. Provided that the mass to be cut contains a developing tooth, whose tissues vary in compactness from the dense enamel or dentine to the fine, delicate, web-like structure of the stellate reticulum, it is evident that so heterogeneous a structure will require consolidating before a reliable section can be obtained. This difficulty is overcome by freezing the gum and tissue imbedded in it, and while in this condition making the various sections required. To do this with ease a microtome of some kind must be employed. At first I used Swift's ice and salt freezing microtome, but more recently have manipulated with Cathcart's ether freezing microtome, as follows :—

The substance to be cut is placed, together with a little gum, upon a zinc plate, under which an ether spray is working. Two parallel glass slabs are fixed, one on either side of the zinc plate, which act as a rest for the razor or plane iron to glide upon, which, with the frozen tissue upon it, can be raised by turning a milled head screw, and the tissue cut by sliding the knife, coated with spirit and water, along the glass slabs. A fine section of the tissue will now be found on the knife, and should be carefully washed off with a camel-hair brush and a free supply of spirit and water into a shallow vessel containing distilled water. The nests of cabinet saucers used by architects are very useful receptacles for the sections. When one saucer is filled with them another may be superimposed upon it, and will be ready to receive more sections, and also perform the function of keeping those in the lower saucer free from dirt until time can be devoted to mounting them.

The section cutting is continued until a sufficient number of good specimens has been obtained.

Our whole attention is now turned to the successful mounting of the sections. Since the tissues when cut were infiltrated with gum, we naturally suppose that the water in which they are contained will have a little in solution, and if they have remained for some time in the water we shall know by its yellow colour that it also contains some picric acid.

The whole of the water with the gum and picric acid in solution may be removed by means of a small syringe, leaving the sections almost dry on the bottom of the vessel. Distilled water is now added and the process repeated until the sections are quite free from gum and acid. The washing should not be continued for long if we wish to retain the picric acid as a staining agent.

A few drops of picro-carmine or logwood should be added to the water containing the sections, care being taken in the case of logwood to filter before using. The sections will stain rapidly or slowly according to the strength of the staining substance used. I generally allow my sections to remain in the weak fluid for from eight to ten hours. When the sections are sufficiently dark in colour the staining fluid may be drawn off by means of the syringe as before described, and clean distilled water substituted. The sections are protected by a lid from any dust, which might fall upon them while the slips and cover glasses are being cleaned and prepared for use.

A little difficulty now presents itself, viz.: How is a thin section to be got upon the glass slide without tearing or injuring? My plan is as follows :—

In my left hand I have a clean round cover glass held between the nibs of a pair of foil carriers and dip it into the water containing the sections. With a fine gold needle inserted into a camel hair brush carrier held in my right hand, I draw the water over the upper surface of the cover. Having decided which section to take I pass the cover close to it, and then slightly tilt the section with the gold wire, at the same time passing the cover glass clean under the section as it were to float it upon the cover. The glass cover is gradually removed from the water, the gold wire holding the section in place until its upper edge is out of the water. If the section is not flat on the cover, it may be refloated and brought into proper position. Place the cover on one end of a clean glass slip, and examine it with a low power under the microscope to see if the section is worth preserving, if so drain off the water from the cover with blotting-paper and add two or three drops of absolute alcohol to the section. After the spirit has remained on the section for a few minutes, it will have abstracted any water which was left by the blotting-paper and may be removed in the same way as the water itself. Two or three minims of oil of cloves, dropped from a drop bottle upon the section will clear it and remove any spirit which may have remained. The work of mounting is now almost at an end, it only remains to allow the cloves to drain off and drop two drops of Canada balsam upon the section. A watch glass may be inverted over the cover to protect it from dust, and the specimen left to stand over night. In the morning the glass cover with the section upon it is seized with the foil carriers and turned completely over on to the centre of the slip. If the process has been carefully and properly performed the practitioner will have in his possession a preserved object, which will instruct and amuse him in his leisure hours.

Before closing I should like to warn the young student against two great enemies, viz., dirt and moisture. Nothing short of absolute cleanliness in manipulating will get rid of the dirt, and every minute particular will have to be attended to, to prevent moisture making its appearance in the finished object.

THE PHYSIOLOGICAL ACTION OF MESMERISM.

A Lecture delivered at, and recently published in the "Proceedings" of, the Royal Institution of Great Britain, on March 14th, 1884.

By J. N. Langley, M.A., F.R.S.

Scattered about in the literature of the seventeenth and eighteenth centuries are many records of the cure of divers human maladies in simple and mysterious-seeming ways.

Valentin Greaterakes, in Charles II.'s reign, was, we are told, "famous for curing various diseases and distempers by a stroak of the hand only." His power, he thought, was a special gift from heaven. Many people, however, were not slow to say that he had dealings with the devil. In some cases wonders were wrought by touching the effected parts of the patient with a magnet. Maxwell, who in 1679 published a short treatise on magnetic medicine, attributed the cures brought about by this, and by some other unusual forms of medical practice, to the accumulation of a subtile fluid in the body of the patient. This subtile fluid was diffused through all things in nature; a fortunate few amongst men had an inborn power of controlling its distribution. Such men could cure all diseases; they could indeed, he says, by adding to their own proper quantum of fluid, make themselves live for ever, were not the influence of the stars adverse.

In 1775 the theory of animal magnetism was put forward in Vienna by Friedrich Anton Mesmer. Neither his theories nor his facts differ very greatly from those of some of his predecessors. There exists, he said, in nature a universal fluid; in virtue of this, the human body possesses "properties analogous to those of a magnet; there are to be distinguished in it poles equally different and opposite, which may even be communicated, changed, destroyed, and restored; even the phenomenon of inclination is observed therein." By means of this magnetic fluid all the maladies of man could be healed. A few years later Mesmer left Vienna for Paris. At first he magnetised his patients by gazing steadily at them, or by means of "passes;" but as patients became more numerous, he brought them into a proper magnetic condition by other methods, often of a very fantastic nature. The patients did not, when magnetised, all show the same symptoms; some passed into a heavy sleep, some became insensible to touch, or even to stimuli ordinarily painful; some became cataleptic, some were seized with local or general convulsions. This last condition was called a crisis, and was the triumph of the mesmeriser, the moment when the disease was considered to be forcibly expelled from the system. Now-a-days it is the last state a physician would care to produce in a patient.

For a time Mesmer's success was enormous. His admirers subscribed for him a sum of nearly 350,000 francs, receiving in return details as to the method of magnetisation. In Paris the belief in the power of Mesmer to cure diseases soon waned; but by this time he had made a stir in the world, and had drawn attention to a number of facts which were either only locally known or largely disregarded.

Mesmer devoted himself chiefly to curing patients, and it must be added, to receiving fees; but about ten years after the time of his coming to Paris it was found that a state resembling somnambulism, or sleep-walking, could be produced in some persons by magnetising them. This gave a stimulus to the investigation of what I may call the magical side of the phenomena. This magical side had always been present, but in the height of Mesmer's power had not been much regarded. Of the magic of animal magnetism I will say one word more presently.

The term animal magnetism lingered long, but has now happily fallen into disuse, either mesmerism or hypnotism being used in its stead. "Hypnotism" we owe to Dr. Braid of Manchester, who, from 1841 to the time of his death in 1860, subjected all the phenomena said to be produced in the magnetic state to a searching investigation. Braid is the founder of mesmerism in its scientific aspect. Hypnotism and mesmerism, as commonly used now, are synonymous terms; it would be advantageous, I think, if we could make a distinction between them. We might, for example, use the term hypnotism to embrace all those phenomena which are proven, and the term mesmerism to embrace all those phenomena which are not proven. Mesmerism would then mean what I have called its magical side, and would embrace those phenomena which are sometimes called the *higher* phenomena of mesmerism. These are of various kinds. It is said, for instance, that one person can, at any time he wishes, mesmerise another who is at a distance, and who is in perfect ignorance of the intentions of the mesmeriser ; that a mesmerised person can perceive the thoughts and sensations of the mesmeriser, without receiving any indications from the known organs of sense ; that a clairvoyant can see with parts of the body other than the eyes, for example with the back of the head, or with the pit of the stomach ; that a clairvoyant can describe places and persons which he has never read of, or heard of, or seen. Those observers who have done most to elucidate the subject, such as Braid, have failed to observe any of these and other similar higher phenomena. They are unproven. It would be convenient, I say, to include such phenomena only under the heading of mesmerism ; but this I cannot yet venture to do. The facts I have to mention I shall call those of hypnotism or mesmerism indifferently. The magical side of the subject may, I think, at present be fairly left out of account.

Primarily, the hypnotic or mesmeric state is one in which the will is partially or wholly paralysed by certain sensory impressions ; but there is no distinct line of demarcation between this and various other conditions, such as occur in sleep, somnambulism, and in some diseases of the central nervous system, such as hysteria. In each there is a typical state, but between them are many transition states.

Before discussing the mesmeric condition, I must say one or two words about the action of the central nervous system. I trust you will forgive me if, as very well may be the case, you find that part of what I say seems too simple to need saying, and part too complex and uncertain to be said without reservation. The one for the sake of clearness must needs be stated ; the other for the sake of brevity must needs be dogmatic.

Here is a diagram of the brain and of the spinal cord of the frog. In this, all the chief structures of the brain of man are represented. For my present purpose it is only necessary to distinguish three divisions.

First, there is the spinal cord. If a frog be decapitated, the brain is of course removed, and the spinal cord is the only part of the central nervous system left. Yet if any part of the body of the brainless frog be gently stimulated, a particular movement results —a reflex action is produced. If, for instance, the right hind leg is gently pinched, this leg and this only is kicked out; if the left fore leg is gently pinched, this and this only is moved. Diagrammatically we may represent any one of these movements as being brought about in the following way. Pinching the skin stimulates the nerve endings of a sensory nerve, so that a nerve impulse—analogous to, but not identical with, an electric current passing along a wire—travels up the nerve to a sensory nerve cell in the spinal cord. In this nerve cell certain changes take place which result in an impulse being sent along another nerve to a motor nerve cell in the spinal cord. This is, in consequence, stimulated to activity and sends out a third impulse along a motor nerve to a muscle. The muscle then contracts, and the limb is moved.

If the brainless frog be pinched somewhat sharply, the movements which result are more extensive than when it is gently pinched; a spasm of the whole body may result. Referring to the diagram, we may represent this in the following way. The sensory cell being more strongly affected, sends out impulses to a number of other sensory cells on the opposite side of the spinal cord, and above and below it; these send impulses to their motor centres, and thus a more or less widely-spread movement results. This spreading out of impulses from the part immediately affected is called the irradiation of exciting impulses. When any part of the skin is stimulated, many sensory and many motor cells are affected; a collection of cells serving a common purpose is called a nerve centre. The spinal cord, then, consists of a collection of nerve centres. By appropriate stimulation, any one or all of these nerve centres can be set in activity.

The second division of the central nervous system is the posterior part of the brain—the brain minus the cortex of the cerebral hemispheres. This, like the spinal cord, consists of a collection of nerve centres, but the function of these nerve centres is much more complex than that of the centres of the spinal cord. A stimulus to the skin, which, when the spinal cord is the only part of the central nervous system left, will produce either a local movement or no movement at all, will, when the posterior part of the brain is also present, produce a general co-ordinated movement such as occurs in walking, jumping, swimming. In fact, all the co-ordinated movements of which the body is capable can be brought about by the activity of one or more of the lower centres of the brain. Moreover, these centres can be set in action by events which have no effect when the spinal cord only is present. Here a flash of light or a sudden noise sets in activity a nerve centre in a manner strictly comparable to the way in which a pinch applied to the foot sets in activity a nerve centre in the spinal cord; and just as in the spinal cord the active sensory centre may excite to activity a motor centre, and this may cause the foot to be moved, so in the lower centres of the brain the activity of the visual or auditory centre may excite to activity a motor centre and lead to a complicated movement such as shrinking or jumping. A frog with these two divisions only of the central nervous system does nothing of itself; it is without will and consciousness, in the same way that the frog with a spinal cord only is without will and consciousness; it is a complicated machine, any part of which can be put in action by using the proper means.

The last division of the central nervous system is the *cortex* of the cerebral hemispheres. This part of the brain is concerned with ideas, with will, and with consciousness in the sense in which that term is usually employed, that is, speaking generally, it is concerned with the higher psychical functions.* In saying that this part of the brain is *concerned* with the higher psychical functions, I mean that every higher psychical act is accompanied by some definite change in the cortex of the cerebral hemisphere. I mean that every emotion, every idea, every effort of will, is accompanied by an activity of nerve cells in this part of the brain and that this activity is comparable to the activity which takes place in definite cells of the spinal cord when a leg or arm of a brainless frog is pinched.

Here we touch the much disputed question of the localisation of the functions of the brain. Roughly speaking, this question is whether there are nerve centres in the cortex corresponding to those which exist in the rest of the brain and in the spinal cord:—whether, for example, visual sensation and ideas are accompanied by an activity of one part of the cortex, and auditory sensation and ideas are accompanied by an activity of a different part of the cortex ; or whether visual and auditory sensation and ideas may occur in any part of the cortex, the mode of activity of the cells being different in the two cases.

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* It is not possible within the limits of this lecture to give the reservations that would be necessary in a full discussion of the subject.

Happily, it is not necessary to enter into this question in order to gain a fair idea of the chief features of mesmerism. The idea which we gain lacks no doubt definiteness in detail, and we must be prepared to express in different language according as we find later, that the cortex of the cerebral hemispheres consists of one nerve centre with many functions, or of many nerve centres with different functions, or again as we find—and this is most probable—that the truth is between these two extreme theories.

But whilst we may put in the background the question of localisation of function for the cortex of the brain, we must linger a little to consider its mode of action. I will take a particular instance.

The changes which occur in the retina of the eye when the rays of light from an external object fall upon it give rise to nervous impulses which eventually produce in the cortex of the brain a certain activity ; this activity leads to our forming an idea of the object. Now in some cases the formation of the idea is all that takes place : often, however, impulses are sent out from the active cells of the cortex to a motor centre in the lower part of the brain, and a movement is made. This is a reflex action from the cerebral cortex. Here the active sensory centre excites a motor centre, just as happens in the spinal cord of a frog the leg of which is pinched. Our actions are often of this nature, though in many cases of course it is very difficult to say how far the will is exercised in the action. If you give a child a sweetmeat, the child sometimes no doubt deliberates what to do with it ; in others the rapid transference of the sweetmeat to the mouth seems to be simply a reflex action entirely independent of any effort of will, though accompanied by consciousness.

Dr. Carpenter has introduced the useful term unconscious cerebration into physiological-psychology. By this is meant that the cortex may be active without our knowing anything about it. An instance which Dr. Carpenter gives, is that of trying to remember a name which for the moment we have forgotten ; in such cases it is often best to give up consciously thinking, but the fundamental activities in the brain which accompany thinking go on nevertheless, so that presently, without further conscious effort, the name is remembered, is as it were thrown up into consciousness.

I said a moment ago that reflex actions not infrequently occur in which a conscious idea forms part of the reflex chain. But consciousness is not necessary to the reflex action; that is, the changes in the cortex which are the physical basis of the idea may be carried out without giving rise to consciousness. Here we want a term to imply that state in which everything necessary for an idea is present except consciousness. Sometimes this is called an "unconscious idea," which would be convenient enough but that "idea" is generally taken to imply consciousness. It is an act of unconscious cerebration.

Reflex actions in which an unconscious cerebration forms part of the chain occur to all of us. Some time ago, whilst walking up and down the laboratory at Cambridge, thinking intently on the result of an experiment, I noticed that the pipe which I had been smoking had gone out. Making up my mind to light it again, I walked to the place where the matches were kept, which happened to be close to a water-tap. As I went I began thinking again of my experiment. In a moment or two I was disturbed by a rush of cold water over my hand. I found that I had turned the water-tap, and let the stream of water run full into the bowl of my pipe. This was a reflex action from the cerebral cortex. The sight of the tap had given rise to what for this once I will call an unconscious idea, which had led to the somewhat complex movements of turning the tap and collecting the water in the pipe-bowl.

The central nervous system consists, then, of a vast number of nerve centres, each of which can be set in activity by an appropriate nerve impulse reaching it either by a peripheral nerve or from some other nerve centre. The action of these nerve centres is normally controlled by the will.

Here, at last, we come to mesmerism. The primary point in mesmerism is the paralysis of the will; the nervous system is then out of the control of the subject, whether animal or man, and by appropriate stimulation any one or more of his nerve centres can be set in activity. I shall consider first the behaviour of the lower animals when mesmerised: in these the phenomena, as far as at present observed, are much simpler than they are in man. If a frog be turned over on its back it at once regains its normal position; if, however, it be prevented from doing so, and its struggles are for a short time gently suppressed, it becomes hypnotised. Then, although it be left at liberty to regain its normal position, it will not attempt to do so. Apart from the movements it makes in breathing, it lies motionless. If it has been held for a short time only, the hypnotic state does not last long, usually from one to five or ten minutes; but if the movements it makes, say at the end of one minute, of five minutes, and so on, are suppressed, it will not infrequently happen that the frog will then stay without further movement for a considerable time, sometimes even for many hours. During the first part of this time a slight pinch, a sudden flash of light, or a loud noise, will usually cause it to turn over and sit up in its normal manner. For a moment or two it looks a lttle dull and confused, but rapidly regains its normal activity. During the latter part of this time it responds less and less to external stimuli. Reflex actions are less readily obtained, or may not be produced at all by stimuli ordinarily effective. Within certain limits, the longer the frog remains hypnotised, the more marked becomes its general insensibility, the decrease in reaction being earliest distinct in the centres of special sense. When it is in this state, it may be propped up against a support with its legs crossed under it, or placed so that it rests on its head, or placed on its side with its legs arranged in this or that fashion, without offering the least resistance. Strong stimuli, or certain apparently lesser ones, for example a dash of water, cause it to recover its position slowly; it then usually sits for several minutes motionless, and only after some time regains its normal sensitiveness and activity. I show you here a frog in the early hypnotic state.

(To be concluded.)

JOURNALISTIC SUMMARY.

THE DENTAL COSMOS. *(July, PHILADELPHIA.)*

THERE is a report of the Annual Meeting of the First District Dental Society of the State of New York. Dr. C. W. Strang presented a young patient with necrosis of the lower jaw. Joseph F——, now aged seven, presented himself, accompanied by his family physician, for treatment in July, 1884. Upon examination it was found that there was necrosed bone anterior to the inferior first permanent molar on the right side. It appeared, from the history of the case then given, that about December 22nd, 1883, there was severe pain in the parts, and that a dentist was called upon, who extracted the second temporary molar on the right side. The pain greatly increased after the operation, and the face became much swollen. After about three days the pain subsided, and nothing more was thought of it, but the swelling did not entirely disappear. In June the parents of the boy noticed a portion of the alveolar process protruding through the gum. Treatment consisted in applying aromatic sulphuric acid for several months, until the process was exposed to the permanent lateral incisor; the temporary first molar, cuspid, and lateral incisor having, in the meantime, become so loose that they were easily removed with the fingers. Soon after the treatment was begun a fistula formed near the angle of the jaw, from which shortly after a small piece of bone was removed. In January last all the necrosed bone that could be detected was removed. The permanent cuspid was found but partially developed (merely a part of the crown had become calcified), and was also removed. The fistulous opening closed immediately after the operation, but subsequently opened again a few weeks thereafter, and there is still a very slight discharge of pus from it. The sixth-year molar is healthy, and reproduction of bone is constantly going on anteriorly. Treatment since the operation has consisted in syringing the parts two or three times daily with phénol sodique, onc to four parts water, and an occasional application of aromatic sulphuric acid.

There was a test of the merits of the Herbst method of burnishing gold into cavities as compared with the mallet method. Dr. E. Parmly Brown represented the mallet method, Dr. Abbott worked with hand-rotating burnishers, and Dr. Bödecker appeared for the Herbst method. They first proceeded to fill some glass tubes, which had been prepared for the purpose, of as near an equal size as they could be made. Dr. Brown, using the electric mallet, filled a tube in twenty-nine minutes; Dr. Abbott filled one in six and a half minutes, and Dr. Bödecker performed a like operation in six minutes. The most perfect adaptability was obtained by the Herbst method by burnishing the gold against the walls with agate points rotated by the engine. They also tried the packing of gold into a steel matrix. The results were as follows:—Dr. Brown occupied forty minutes in inserting the gold, and the weight of the plug was eighteen grains; Dr. Abbott spent seven and a half minutes, having some one to feed the gold, and the weight was seventeen grains. Dr. Bödecker took eleven minutes, handling the gold himself, and the weight was fourteen and one-half grains.

At the regular monthly meeting of the Society, held on May 5th, Dr. E. A. Bogue said :—Since the effort to make cocaine serviceable in the excavation of cavities in teeth, I have been comparing its advantages with those of veratria, which drug was brought to the notice of this Society two years ago, and I have found that veratria, as I have it prepared, has been of far more service to me than cocaine has. By leaving it in the cavity, the rubber-dam being in position, while I go on to prepare, and perhaps fill another small cavity in the neighbourhood, the more important cavity when I return to it is found to be nearly obtunded, and I am able to excavate with little or no pain to the patient. After having left it in the cavity a few moments, I wipe out the cavity with alcohol and dry it. I can then apply hot air, if required, without pain to the patient. The formula is six minims of absolute alcohol, six grains of veratria, with an equal quantity of pure carbolic acid, and five drops of glycerine. Prepared in that way I find it works admirably.

Dr. C. E. Latimer : When you combine carbolic acid and something else with the veratria, how do you know that the effect is due to that agent and not to the carbolic acid, which acts in the same way ?

Dr. Bogue : Because I have tried each one separately. Each element constituting the remedy has been tried by itself. I have tried the glycerine and tannin called Näboli, and alcohol and chloroform. I set myself to thinking in what way they operated. I imagined that glycerine, having a strong affinity for water, drew out the water in the dentinal tubes. The next step was to use hot air, which I did, and it hurt the patient very much. I put in carbolic acid to get rid of that hurt, and in a few moments thereafter I dried out the cavity and turned on the hot air. I could then finish the excavating without trouble ; at least I did so a good many times ; occasionally I had a failure. Looking among the alkaloids I tried veratria, hyoscyamus, and atropia, and some others, but none of them acted as well as veratria. I have been using it for about three years with very satisfactory results.

Dr. Bödecker said he had used veratria in combination with glycerine and alcohol in a good many cases within the last two years, in some of them with excellent results ; especially in those cases where there is a good deal of soft decay around the cervical margin of the cavity.

Dr. G. W. Weld read a paper upon "CHLOROFORM AND THE FIFTH PAIR OF NERVES."

At the March meeting of the Odontological Society of Pennsylvania, Dr. S. B. Luckie read a paper entitled "THE SETTING OF PORCELAIN AND OTHER CROWNS," upon which a discussion followed.

DENTAL ADVERTISER. *(July, BUFFALO.)*

"MIXED ANÆSTHETICS," by Dr. Lawrence Turnbull. The writer alludes to the use of a mixture of chloroform and nitrous oxide and the death of one or more individuals whilst under its influence, also to the article by Mr. W. Tyrrell published in the *Dental Record* (vol. V., page 153). He refers to the experiments of Dr. Lauder Brunton on the sedative effect of chloroform upon the heart's action, and the reflex phenomena on irritation of the sensory filaments of the fifth nerve, thereby showing that a small dose of chloroform is a most dangerous thing. Too much caution cannot be written and taught that the heart power is most seriously reduced by its action, and that it is incapable of supplying the brain properly, unless the patient is in a recumbent posture.

It has been clearly proven by Dr. Gasper Griswold that in cardiac and respiratory failure the pneumogastric nerve retains its excitability in chloroform poisoning, and it is, therefore, extremely dangerous to supply electricity to the neck in this condition. As an anæsthetic mixture the writer recommends nitrous oxide and anhydrous æther, and concludes with the observation that anæsthesia produced by a mixture of gas and chloroform draws the patient too close to the danger line to make it applicable for general use in dental operations.

"CLASP AND BAND MATRICES," by Dr. J. A. Woodward. This article, illustrated, also appeared in the June number of the *Dental Cosmos.*

"THE TEETH OF DIFFERENT PEOPLE," by Parsons Shaw, D.D.S. (Manchester), is an article from the *Archives of Dentistry.*

THE INDEPENDENT PRACTITIONER. *(July, NEW YORK.)*

"Some Recent Events connected with the Dental Profession in England," by Dr. W. H. Waite (Liverpool). This was the subject of a paper read before the Dental Society of the State of New York, on May 14th. Dr. Waite referred to the Manchester meeting, which was summoned in 1875 by Mr. Sidney Wormald, of Stockport. The outcome of that meeting was the formation of the Dental Reform Committee, whose work culminated in the passing of the Dentists' Act, 1878, and, in 1879, the formation of the British Dental Association, with its journal, "the particular organ of the Association, and the best journal in England."

It would obviously be invidious in a rapid sketch like this to attempt any eulogy, or to pay anything more than a passing tribute of admiration and gratitude. The name of John Tomes is familiar to dentists throughout the world, and it will descend to posterity, associated not alone with laborious investigations in the realms of science, but as the head of this great movement, whereby our calling has been lifted out of degredation into a recognised position. Alongside we must place the well known and much-respected name of James Smith Turner, to whose sleepless watchfulness and untiring energy very much of the rapidity and success of our advancement must be attributed. Thus wisdom and resolute determination were allied, and future generations laid under a perpetual obligation. To these two men, ably supported as they were by the counsel and co-operation of the whole of the committee, belongs the satisfaction of something accomplished in the interest of humanity : not a perfect thing, but as perfect, probably, as it could be made ; not a present boon, but a broad foundation upon which shall arise, as years roll on, a superstructure of encouragement and stimulus to future practitioners, and of comfort and blessing to the general community. All honour to men who labour to such noble purpose.

The establishment of the British Dental Association marks a new era in the Dental profession. It is not only an advance, but it is a new departure. Organised upon a thoroughly broad and representative basis, sanctioned by the approval and authority of Government, offering inducements to all and exclusion to none who desire the real elevation of our calling, affording through its various branches occasion for exercise and development of latent power in each section of the country, the British Dental Association promises to exert a mighty renovating influence upon all our future progress.

"ATMOSPHERIC PRESSURE IN THE RETENTION OF ENTIRE DENTURES," by Dr. W. B. Ames. My course of procedure for upper dentures is to obtain a good impression of the jaw with any material whatever, being especially careful to have the impression extend a little beyond the margin of the hard palate, well up beneath the lip and cheeks and around the maxillary tuberosities. The material for the impression should be of such a consistency as will compress all soft or lax parts, or the model obtained from it should be pared down at the location of these parts. Then should be ascertained and marked out upon the model the exact location of the points where the laxity of the soft tissue of the palate commences. Posterior to this line an obtuse groove should be made across the model, extending from the region behind one tuberosity to that opposite. This groove should terminate at each side, at a point where the edge of the plate will be well covered by the buccal tissues, thus leaving no possibility of the entrance of air beneath the plate. The depth of the groove must depend upon the laxity of the parts. It should be of the depth to which it is desired the plate shall displace the tissues.

By constructing a plate over this model, allowing it to extend posteriorly into the groove and well up beneath the lip and cheeks, it will not be apt to exert any perceptible influence on the surface of the mouth when there is no force applied to displace it; but immediately upon its displacement from contact with any portion of the surface a vacuum is produced, from the fact that all edges of the plate were slightly displacing lax tissues that will follow the edge downward, and atmospheric pressure be obtained over all firm parts of the jaw. When removal is desired the force can be broken by raising the lip, thus admitting air beneath the plate.

The ideal atmospheric pressure plate is one which offers the maximum resistance to displacement with the minimum of bad results from traction upon the tissues. By the above method a plain plate can be made to embody in a greater degree all of the advantages of a cavity plate, without the bad effects of the cavity.

A few patients cannot tolerate a plate extending upon or near the soft palate, on account of the nausea produced. In such cases the groove can be formed as far forward as is necessary, and the posterior edge of the plate made to consist of soft rubber, which from its flexibility will give an accommodating contact, to answer the same purpose as the yielding soft parts with the other form of plate.

"DENTISTRY IN FRANCE," by R. Holms. The writer corrects some false statements published in a contemporary, and gives a translation of two lectures delivered at the Dental School of France (*Institut Odontotechnique de France*), on "The Resection of Teeth," by Dr. Andrien.

ITEMS OF INTEREST. *(July, PHILADELPHIA.)*

"OUR PROFESSIONAL STANDING," by Professor G. V. Black. In my observation of men it has appeared that dentists have won for themselves as fair a share of this world's goods, when compared with the capital, knowledge and energy invested in the business, as has fallen to the lot of men in other pursuits. The dentist who is well fitted for practice, and has a fair personal address, rarely fails to make a reasonably good living. Some very well informed men fail, but it is usually to be explained by some mistake in location or equipment, but oftener from errors of personal conduct. Those who attain wealth rapidly are comparatively few in any profession, and dentistry is no exception to the general rule. Yet there are examples enough to show that the dentist may accumulate wealth with considerable rapidity; but, at the same time, it must be conceded that dentistry is not the profession for a man to choose whose principal desire is to obtain great wealth quickly. Those who enter this profession with the desire to attain great fame may as well retire at once; but to those who wish to be known as men among men, and attain a good name in society as persons who are doing their full share for the welfare of the race, I would say go directly forward with the course you have chosen. We want you with us, and can promise that you will find ample room for development. Your opportunities for good will enlarge as you progress in your professional work, and an appreciative public will reward you. While dentistry requires, of those who do their duty in its practice, much hard and patient toil, and much that is at times discouraging, it has pleasant features. The dental practitioner, if he manages his time wisely, may have as many hours for undisturbed relaxation or for literary pursuits as the devotee of any other profession. It is rapidly becoming the custom of the members of this profession to establish their hours for office work, and have some time that they can call their own, in which they can go forward with such studies as may be desirable and pleasant, each one following his taste. Or the dentist can devote, if properly and temperately done, much time to the pleasures of society, cultivating friendships, giving and receiving visits. If his tastes incline him in that direction, he can give much attention to the study of science, art and literature. Let me say also that, directly in the line of his profession, there is yet a rich field open to exploration and discovery. The dentist, or indeed any other medical man, be he general practitioner or specialist, need not want for fields of research for many generations to come. No field of research has been more enriched than ours during the present century, and the prospect for finding other and still more brilliant treasures in the years to come is brighter than ever before. It is entirely unnecessary that I point toward special fields that are now in sight. A sufficient number of them will be found in the path of the earnest student. His time may be well spent in legitimate lines of investigation that will give a rich reward to his diligence and perseverance.

"ANTISEPTICS AND DISINFECTANTS," by E. J. Lilly, M.D. (Written for the Mad River Valley Dental Society.) By an antiseptic we understand a substance which has the power of preventing decomposition in dead animal or vegetable matter.

A disinfectant proper arrests putrefaction by destroying the cause, and renders the products harmless. There is no connection between the power which prevents decay from setting in and that which stops it when begun, for antiseptics in general have but a slight effect on bacteria. Exceptions are found, of course, in those substances, like corrosive sublimate, that are violent poisons, and which are both antiseptic and disinfectant.

Generally, antiseptics can be used with good effect in many cases; but the disinfectants—those that can be used with safety—mostly fail to disinfect, so too much reliance should not be placed on them. Suitable precautions must be taken to render their use unnecessary; impure air should never be breathed, nor preventable causes allowed to pollute the air. Decay and decomposition can usually be prevented by antiseptics, if in no other way, for it is much easier to prevent putrefaction from setting in than to check its progress after it has once begun.

"Medicated Wafers," by A. H. Best, M.D., L.D.S.I. At the meeting of the Georgia State Dental Society in May, 1884, I submitted to the consideration of those present what I then termed the "medicated wafers," for the treatment of pericementitis, neuralgia, or ulcerative inflammation arising from periosteal or pulp inflammation of teeth. I also stated that I had found them valuable in relieving the soreness consequent on wedging, and in all cases where the fatigue of the parts from lengthy operations, together with the irritation of polishing, filing, &c., had left a sensation so nearly akin to actual pain, as to render some treatment, either real or apparent, an absolute necessity with nervous patients, and extremely desirable even for the minority not included under that head.

I therefore directed a neighbouring druggist to prepare for me a few pads of blotting-paper saturated with tincture of capsicum, extract of ginger, morphia, oil of mustard, and menthol; the tincture being first evaporated down to half volume on a water-bath, and the other constituents then added.

The blotting-paper was prepared by simply dipping it in the solution, allowing it to dry, and dipping it once more, till it was considered well charged. When the paper had sufficiently dried after the last dipping, one side of it was coated with two or three coats of shellac varnish; it was then cut into squares—the "wafers"—and was ready for use.

For convenience the wafers were put up in small paper boxes, a dozen in each. Patients complaining of soreness, whether incidental or consequent on an operation, were given a box, with instructions to place a wafer over the seat of pain, with the dark side next the cheek, and permit it to remain two hours, renewing the application, if necessary, till relieved. One or two usually had the desired effect.

These wafers are so easily made, so universal in their applicability, and, above all, so effective as a local stimulant and anodyne, to say nothing of the mental effect produced, that they become valuable.

"Continuous Gum Work and the Lilliput Furnace," by Dr. Ambler Tees. After the failure to work successfully the Fletcher gas furnace for continuous gum work in America, I conceived the idea of obtaining the requisite amount of heat in a small furnace, by using for fuel, gas and coke combined, but after experimenting, I found that sufficient heat could be obtained in a very small furnace, from coke alone, by having it screened to a uniform size. The result was the "Lilliput" Furnace.

The fire can be made in a few minutes, the heat coming up quickly, noiselessly, and with certainty, and will fuse continuous gum body in thirty-five minutes after the fire is kindled, when the draft is very strong and the winds high, as within an hour at other times.

"EXTIRPATION OF THE DENTAL PULP," by A. H. Best, M.D., L.D.S.I. The fact must not be lost sight of that, though the pulp may be completely devitalized, it is not separated from the living tissue, unless ulcerative demarcation has set in, which is not likely to exist in recent cases, and not desirable. It is, accordingly, necessary to tear away the devitalized from the living portion of tissue, which often gives severe pain. The connection between dead and living matter is yet so close, that even simple compression transmits sufficient pain to throw undeserved discredit on the efficacy of the devitalization. What is needed is a prompt division of the devitalized pulp from its yet living and hypersensitive connection; and about the most unlikely tool to effect this is the jagged wire—the "nerve-broach."

Of all attenuated substances likely to meet the requirements, none seemed to surpass the advantages offered by exceedingly fine, high-tempered, round steel wire, such as piano strings. I accordingly procured a sample of the proper gauge, and made a nerve-extractor, calculated to pass to the apex of the root, or as far as the size of the canal would warrant. Being soldered to the bit of a dental engine, and run at a high rate of speed, it at once decapitates the pulp, so to speak, and I therefore dubbed it the "nerve-guillotine."

An improvement on this instrument, which soon suggested itself, was the addition of a short spiral at the end to be soldered to the engine bit, so that the guillotine might be used without inconvenience in any direction. Broken bur shanks were used to solder the wire spiral to. The device thus improved was found to be very efficient and by no means expensive.

PASS LIST.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.

DURING the July Examinations the following gentlemen passed the First Professional Examination for the License in Dental Surgery:—Gordon Reid Shiach, Elgin; Arthur Cocker, Halifax; and Frank Gordon Allen, Ripley, Derbyshire; and the following gentlemen passed the Final Examination, and were admitted L.D.S. Edin.: — Thomas Prettie Ritchie, Edinburgh; David Browne, Montrose; and Andrew Burns, London.

Editorial.

THE DENTAL SCHOOLS.

THE reports of the Prize Distributions in connection with the three principal Dental Schools in the United Kingdom, serve as an indication of the close of another *annus medicus*. The next number of the DENTAL RECORD will, as usual, be the Students' number, by which we shall be reminded of the preparation for another year's work. Thus time moves onwards, and events cycle round.

The report by the Dean of each of the respective schools severally indicate a satisfactory progress in the study of Dental science, and, furthermore, that each school is successfully fulfilling its object as an educational institution. This is so even with the youngest of the trio, and the authorities of the Dental School in the grey metropolis of the north are justly stimulated to provide increased facilities for their students. A similar want of accommodation is also felt at the Leicester Square school.

From those who, as students, have won honours at their schools, there are anticipated by the profession still greater results. They are looked upon as being the most likely to contribute by their works to the advancement of the science and art of the specialty that they have selected. The accession of honour carries with it greater responsibilities.

MESMERISM.

In the last February number of the DENTAL RECORD there appeared two articles upon tooth extraction whilst under the mesmeric influence, and an Editorial article, dealing with the general aspect of mesmerism, was also published. At page 365 of this journal there is reproduced from the *Proceedings of the Royal Institution* a lecture upon the "Physiological Aspect of Mesmerism." The instructive character of the lecture has induced us to place it before our readers.

GOSSIP.

MR. FRANK DELLA TORRE, of Baltimore, has been studying a practical method of ascertaining the proximity of icebergs in fog, with the view of preventing collisions at sea. His experiments indicate the possibility of obtaining an echo from an iceberg when in dangerous proximity to a ship. The apparatus employed consisted of a musket, to the muzzle of which a speaking trumpet had been attached. This gun was aimed at passing vessels while blank cartridges were fired. After an interval of time, varying according to the distance of the vessel, an echo was returned. He claims that a steam whistle or siren, combined with a projecting apparatus like a speaking trumpet, will prove as efficient as a gun.

UNDER the auspices of the German Government, borings are being carried on near Schladebach for the purpose of determining the earth's temperature. At the depth of 1·392 metres (4,567 feet) the temperature was found to be 49° C., or 120° Fahr. It is computed that at this rate of increase the temperature of boiling water should be reached at a depth of 3,000 metres.

THE post of Tutorial Dental Surgeon at the Edinburgh Dental Hospital and School will shortly be vacant. Salary £30. Applications received till 1st October.

MR. J. C. BUTTERFIELD was, on the 22nd ult., returned unopposed for a vacancy in the South Centre Ward of the City of Cork.

By means of a captive balloon made of translucent material, and in which are fixed a number of incandescent lamps, Mr. Eric S. Bruce believes he has produced an invention which will be of importance in future warfare. He illuminates the balloon with flashes of light of longer or shorter duration, similar to the Morse system of telegraphy; and thereby signals may be flashed at night over very wide areas.

Monthly Statement of operations performed at the two Dental Hospitals in London and the Birmingham Dental Hospital, from June 1st to June 30th, 1885:—

		National.	London.	Birmingham.
Number of Patients attended ...		1,524	--	838
Extractions	Children under 14	447	411	668
	Adults	572	921	
	Under Nitrous Oxide	502	545	13
Gold Stoppings ...		80	365	11
Other Stoppings ...		553	822	192
Advice ...		236	140	—
Irregularities of the Teeth		230	105	—
Miscellaneous ...		120	323	23
Total...		2,740	3,632	907

Quarterly Report of cases at the Dental Hospital of Exeter, from April 1st to June 30th, 1885:—

Extractions	Children under 14 ...	270
	Adults ...	579
	Under Nitrous Oxide ...	26
Stoppings with Gold...		3
,, ,,	White Foil...	8
,, ,,	Plastic Material ...	124
Miscellaneous—		
	Irregularities of the Teeth, Scaling, &c. ...	104
Total ...		1,114

THE

DENTAL RECORD.

VOL. V. SEPTEMBER 1, 1885. No. 9.

Educational Section.

SUGGESTIONS TO STUDENTS.

THE Professional Education of the Dental Student consists of Apprenticeship, or instruction in Mechanical Dentistry, for a period of not less than three years : Attendance on Lectures, &c., at a General Hospital and Medical School for two Winter and one Summer Sessions—eighteen months : Also attendance at a Dental Hospital and School for two years. The attendance at the General Medical and at the Special Dental Hospitals and Schools may be carried out simultaneously, and completed in two years. This plan of work takes up the whole of the Student's time, and it is impossible for him to concurrently engage in any Mechanical or other employment.

Before commencing his Professional Education, the Dental Student must pass a Preliminary Examination in Arts. The examination most to be recommended is the matriculation of the University of London. Passing that examination will enable the student subsequently to present himself for an University degree, should he desire to do so. A list of the several examinations recognised by the General Medical Council as fulfilling the conditions required by that body regarding Preliminary Education is to be found on page 388.

Any one who commenced his professional education before the 22nd July, 1878, is exempt from the Preliminary Examination.

After passing a Preliminary Examination, the student must receive at least three years' instruction in Mechanical Dentistry under a registered Dentist. It should be distinctly understood that the Royal College of Surgeons of England consider those three years of instruction, whether in the form of serving articles, or apprenticeship to Mechanical Dentistry, or otherwise, as Professional Education ; therefore, they follow the Preliminary Examination.

Having received a certificate of his Preliminary Examination, and commenced his Professional Education, either by apprenticeship or by hospital studies, it is necessary to register the same at the Medical Council Office, 299, Oxford Street, London, W. This must be done within fifteen days from the commencement of the pupil's professional studies. The beginning of such studies will not be recognised by any of the qualifying bodies as dating earlier than fifteen days before the time of registration.

Any one registered as a Medical Student must also register as a Dental Student, if he be such.

Having served his articles, the student may enter a General or a Dental Hospital, or both, and complete the Curriculum of at least four years of study from the date of registration ; after which he is eligible to be admitted to examination for the Dental License.

Though the possession of the License in Dental Surgery is necessary for a name to be entered on the *Dentists' Register*, the student is strongly recommended to obtain some additional qualification in either Medicine or Surgery. On the other hand, though a Medical or a Surgical, other than the special Dental, qualification entitles its possessor to practise Dentistry, yet the course of study for such does not include any Dental instruction. Therefore, to be a Dentist requires a more or less complete compliance with the Dental Curriculum.

It will be observed that the Curricula of the several Licensing Bodies differ somewhat from one another. The Curriculum of the Royal College of Surgeons of England exceeds the minimum course of study recommended by the Medical Council by prescribing attendance upon a second course of lectures on Dental Anatomy, Dental Surgery and Dental Mechanics ; so also does the Curriculum of the Royal College of Surgeons in Ireland, by requiring a course of Practical Physiology and an extra six months' General Hospital

Practice, besides three examinations at different periods. The Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, require only six, instead of not less than twelve, months' attendance at a recognised General Hospital, with clinical instruction.

REGISTRATION OF DENTAL STUDENTS.

The Registration of Dental Students shall be carried on at the Medical Council Office, 299, Oxford Street, London, W., in the same manner as the existing Registration of Medical Students—as hereinafter set forth—and subject to the same regulations as regards Preliminary Examinations.

Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by attendance upon professional lectures, before July 22nd, 1878 (when Dental education became compulsory), shall not be required to produce evidence of having passed a Preliminary Examination.

Pupils who have been articled to their fathers or to brothers —with whom money transactions would be nominal—shall, in all other respects, be considered to be in the same position in regard to registration as those pupils provided for in the first part of Section 37 of the Dentists' Act, who have paid premiums for instruction.

Candidates for a Diploma in Dental Surgery shall produce certificates of having been engaged during four years in Professional Studies, and of having received three years' instruction in Mechanical Dentistry from a registered Practitioner.

One year's *bona fide* apprenticeship with a registered Dental Practitioner, after being registered as a Dental Student, may be counted as one of the four years of Professional Study.

The three years of instruction in Mechanical Dentistry, or any part of them, may be taken by the Dental Student either before or after his registration as a Student; but no year of such mechanical instruction shall be counted as one of the four years of Professional Study unless taken after registration.

The privilege provided by the first clause of Section 37 of the Dentists' Act, for persons whose Articles of Apprenticeship expired before January 1st, 1880, shall be extended to all persons whose Articles had begun two years before that period.

The commencement of the course of Professional Study recognised by any of the Qualifying Bodies shall not be reckoned as dating earlier than fifteen days before the date of registration.

Forms for Registration may be obtained at the office of the General Medical Council.

PRELIMINARY EDUCATION.

REGULATIONS OF GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or a Dental Student unless he shall have previously passed (at one or more Examinations) a Preliminary Examination in the subjects of General Education as specified in the following list * :—

1. English Language, including Grammar and Composition.
2. Latin, including Grammar, Translation from specified authors, and Translation of easy passages not taken from such authors.
3. Elements of Mathematics, comprising (*a*) Arithmetic, including Vulgar and Decimal Fractions; (*b*) Algebra, including Simple Equations; (*c*) Geometry, including the first book of Euclid, with easy questions on the subject matter of the same.
4. Elementary Mechanics of Solids and Fluids, comprising the Elements of Statics, Dynamics, and Hydrostatics.
5. One of the following optional subjects :—(*a*) Greek, (*b*) French, (*c*) German, (*d*) Italian, (*e*) any other Modern Language, (*f*) Logic, (*g*) Botany, (*h*) Zoology, (*i*) Elementary Chemistry.

The following is a list of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards Preliminary Education :—

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* Examinations in General Education conducted by Universities will be accepted as heretofore, but if in any of these examinations the subject of Elementary Mechanics is not included, a knowledge of that subject will be required at a separate Preliminary Examination.

I.—UNIVERSITIES IN THE UNITED KINGDOM.

UNIVERSITY OF OXFORD :—

1. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—
   Greek, French, German, Natural Philosophy, including Mechanics, Hydrostatics and Pneumatics.
2. Senior Local Examinations ; Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examination for a Degree in Arts.

UNIVERSITY OF CAMBRIDGE :—

6. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—
   Greek, French, German, Natural Philosophy, including the Elements of Statics and Hydrostatics.
7. Senior Local Examinations ; Certificate to include Latin and Mathematics.
8. Higher Local Examinations.
9. Previous Examination.
10. Examination for a Degree in Arts.

UNIVERSITY OF DURHAM :—

11. Examination for Certificate of Proficiency.
12. Examination for Students at the end of their first year.
13. Examination for a Degree in Arts.

UNIVERSITY OF LONDON :—

14. Matriculation Examination.
15. Preliminary Scientific (M.B.) Examination.
16. Examination for a Degree in Arts or Science.

VICTORIA UNIVERSITY :—

17. Preliminary Examination : Latin to be one of the subjects.
18. Entrance Examination in Arts, to include all the subjects required.

UNIVERSITY OF EDINBURGH:—

19. Local Examinations (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—

    Greek, French, German, Natural Philosophy.

20. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—

    Greek, French, German, Natural Philosophy.

21. Preliminary Examination for Graduation in Science or Medicine and Surgery.
22. Examination for a Degree in Arts.

UNIVERSITY OF ABERDEEN:—

23. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
24. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—

    Greek, French, German, Natural Philosophy.

25. Preliminary Examination for Graduation in Medicine or Surgery.
26. Examination for a Degree in Arts.

UNIVERSITY OF GLASGOW:—

27. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
28. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—

    Greek, French, German, Natural Philosophy.

29. Preliminary Examination for Graduation in Medicine or Surgery.
30. Examination for a Degree in Arts.

UNIVERSITY OF ST. ANDREW'S:—

31. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geo-

metry, Latin, and also one of the following optional subjects :—

Greek, French, German, Natural Philosophy.

subjects required.

32. Local Examinations (Junior Certificate); to include all the subjects required.
33. Preliminary Examination for Graduation in Medicine or Surgery.
34. Examination for a Degree in Arts.

UNIVERSITY OF DUBLIN :—

35. Public Entrance Examination.
36. General Examination at end of Senior Freshman year.
37. Examination for a Degree in Arts.

QUEEN'S UNIVERSITY IN IRELAND :—

38. Local Examinations for Men and Women; Certificate to include all the subjects required by the General Medical Council.
39. Entrance or Matriculation Examination.
40. Previous Examination for B.A. Degree.
41. Examination for a Degree in Arts.

ROYAL UNIVERSITY OF IRELAND :—

42. Matriculation Examination.

OXFORD AND CAMBRIDGE SCHOOLS' EXAMINATION BOARD :—

43. *Certificate, to include the following subjects :—
    (*a*) Arithmetic, including Vulgar and Decimal Fractions;
    (*b*) Algebra, including Simple Equations;
    (*c*) Geometry, including the first two books of Euclid;
    (*d*) Latin, including Translation and Grammar;
    (*e*) Also one of these optional subjects :—
    Greek, French, German, Mechanical Division of Natural Philosophy.

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* The *English* is provided for by the following *Resolution*, passed by the Executive Committee on October 27th, 1876 (*Minutes*, Vol. XIII., p. 357) :—

"That, as every Candidate for the Certificate of the Oxford and Cambridge Schools' Examination Board is required to answer questions in such a manner as to satisfy the Examiners that he has an adequate knowledge of English Grammar and Orthography, this shall be held as conforming to the requirements of the Medical Council in reference to English Language."

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE MEDICAL ACT.

APOTHECARIES' SOCIETY OF LONDON:—

44. Examination in Arts.

ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF EDINBURGH:—

45. Preliminary (combined) Examination in General Education.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW:—

46. Preliminary Examination in General Education.

ROYAL COLLEGE OF SURGEONS IN IRELAND:—

47. Preliminary Examination; Certificate to include Mathematics.

III.—EXAMINING BODIES, IN THE UNITED KINGDOM, NOT INCLUDED IN SCHEDULE (A) TO THE MEDICAL ACT (1858).

COLLEGE OF PRECEPTORS:—

48. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and a Modern Language, having been taken.

INTERMEDIATE EDUCATION BOARD OF IRELAND:—

49. Junior Grade Examination 50. Middle Grade Examination 51. Senior Grade Examination	Certificate in each case to include all the subjects required.

ST. DAVID'S COLLEGE, LAMPETER:—

52. Responsions Examination, to include all the subjects required.

EDUCATIONAL INSTITUTE OF SCOTLAND:—

53. Preliminary Medical Examination.

IV.—CERTAIN INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

REGULATIONS OF THE VARIOUS EXAMINING BODIES FOR THE DIPLOMA IN DENTAL SURGERY.

PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Candidates are required to produce the following Certificates:—

1. Of being twenty-one years of age.
2. Of having been engaged during four years in the acquirement of professional knowledge.

3. Of having attended, at a school or schools recognised by this College, not less than one of each of the following courses of lectures, delivered by lecturers recognised by this College, namely: Anatomy, Physiology, Surgery, Medicine, Chemistry and Materia Medica.

4. Of having attended a second winter course of lectures on Anatomy, or a course of not less than twenty lectures on the Anatomy of the Head and Neck, delivered by lecturers recognised by this College.

5. Of having performed dissections at a recognised school during not less than nine months.

6. Of having completed a course of chemical manipulation, under the superintendence of a teacher or lecturer recognised by this College.

7. Of having attended, at a recognised Hospital or Hospitals in the United Kingdom, the practice of Surgery and Clinical Lectures on Surgery during two Winter Sessions.

8. Of having attended, at a recognised school, two courses of lectures upon each of the following subjects, namely:—Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one course of lectures on Metallurgy, by lecturers recognised by this College.

9. Of having been engaged during a period of not less than three years in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent Practitioner. In the cases of qualified Surgeons, evidence of a period of not less than two, instead of three years, of such instruction will be sufficient.

10. Of having attended at a recognised Dental Hospital, or in the Dental Department of a recognised General Hospital, the practice of Dental Surgery during the period of two years.

Note.—All candidates who shall commence their professional education on or after the 22nd July, 1878, will, in addition to the certificates enumerated in the foregoing clauses, be required to produce a certificate of having, prior to such commencement, passed the preliminary examination in general knowledge for the

Diploma of Member of the College, or an examination recognised as equivalent to that examination.

Candidates who were in practice as Dentists, or who had commenced their education as Dentists prior to September, 1859—the date of the Charter—and who are unable to produce the certificates required by the foregoing Regulations, shall furnish the Board of Examiners with a Certificate of Moral and Professional Character, signed by two Members of this College.*

Together with answers to the following inquiries :—

Name Age Professional Address.

If in practice as a Dentist, the date of the commencement thereof.

Whether Member or Licentiate of any College of Physicians or Surgeons of the United Kingdom ; and if so, of what College.

Whether Graduate of any University in the United Kingdom ; and if so, of what University ; and whether Graduate in Arts or Medicine.

The date or dates of any such Diploma, License or Degree.

Whether Member of any Learned or Scientific Society ; and if so, of what.

Whether his practice as a Dentist is carried on in connection with any other business ; and if so, with what business.

Whether, since 22nd July, 1876, he has employed Advertisements or Public Notices of any kind in connection with the practice of his Profession.

The particulars of Professional Education, Medical or Special.

The Board of Examiners will determine whether the evidence of character and education produced by a Candidate be such as to entitle him to examination.

PROFESSIONAL EXAMINATIONS.

The Examination is Written, Oral and Practical.

The Written Examination comprises General Anatomy and Physiology, and General Pathology and Surgery, with especial reference to the practice of the Dental Profession.

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* N.B.—In the case of candidates in practice, or educated in Scotland or Ireland, the Certificate of Moral and Professional Character may be signed by two Licentiates of the Royal College of Surgeons of Edinburgh, or the Faculty of Physicians and Surgeons of Glasgow, or of the Royal College of Surgeons in Ireland, as the case may be.

The Oral and Practical Examinations comprise the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, and by operations, &c.

Members of the College, in the Written Examination, will only have to answer those questions set by the Section of the Board consisting of persons skilled in Dental Surgery ; and in the Oral and Practical Examinations will be examined only by that Section.

A candidate whose qualifications shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.

Examinations will be held in January and June.

The Fee for the Diploma is Ten Guineas, over and above any stamp duty.

NOTE.—A ticket of admission to the Museum, to the Library, and to the College Lectures, will be presented to each candidate on his obtaining the Diploma.

SYLLABUS OF EXAMINATIONS.

In addition to the Special Examination by the Dental Section of the Board of Examiners, candidates are expected to answer questions in the written and *vivâ voce* Examinations on the following subjects :—

ANATOMY AND PHYSIOLOGY.

The names of the Bones, and of their more important parts and their articulations.

The names and position of the principal Arteries, Veins, and Nerves.

The form and relations of the Viscera, of the Head, Chest, and Abdomen, and an elementary knowledge of their structure.

An elementary knowledge of the structure and properties of the principal tissues.

An elementary knowledge of the functions of Digestion, Absorption, Circulation, Respiration, Secretion, Motion, and Sensation.

The Surgical Anatomy and Physiology of the Organs of Mastication, Deglutition, Taste, and Articulation.

PATHOLOGY AND SURGERY.

Inflammation and its consequences.

The healing of Wounds.

The methods of arresting Hæmorrhage.

The union of Fractures.

The signs of Asphyxia, and the treatment of threatened death from Anæsthetics.

The injuries and diseases of the Jaws, Mouth, Fauces, and adjacent parts.

EDWARD TRIMMER, *Secretary.*

PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

PRELIMINARY EXAMINATION.

Candidates for the Dental Diploma must produce evidence of having attained the age of twenty-one years, and will require to produce a Certificate of having passed the Preliminary Examination in General Education required for the ordinary License in Surgery, or an examination equivalent to this, and recognised by the General Medical Council,—except in the case of candidates who shall have commenced their professional education previous to the first day of August, 1878.

PROFESSIONAL EXAMINATION.

Candidates will also be required to produce Certificates of having been engaged during four years in the acquirement of professional knowledge, and of having been during that period, or at some time previous to their examination, engaged for not less than three years in the acquirement of a practical knowledge of Mechanical Dentistry with a practitioner registered under this Act.

LECTURES AND HOSPITAL ATTENDANCE.

The following Lectures and other Courses of Instruction must have been attended by candidates for the Dental Diploma, at a recognised Medical School or Schools; and the number of Lectures in each of the general courses must correspond with those required for the Surgical Diploma of the College :—

Anatomy	One Winter course.
Dissection and Demonstrations..	Nine Months.
or	
Dissection	Nine Months.
and	
Anatomy of Head and Neck ...	One course of Twenty Lectures.

Physiology	One course of not less than Fifty Lectures.
Chemistry	One Winter course.
Surgery	One Winter course.
Medicine	One Winter course.
Materia Medica	One course of Three Months.
Practical Chemistry and Metallurgy	One course of Three Months.
Clinical Instruction in Surgery at a recognised Hospital	One course of Six Months, or Two courses of Three Months.

In addition to these, candidates will require to have attended the following Special Courses of Lectures and Instruction, in terms of the curriculum, and by teachers recognised by this College:—

Dental Anatomy and Physiology	One course of each.
Dental Surgery and Pathology	
Dental Mechanics	

Two years' attendance at a Dental Hospital or the Dental Department of a General Hospital recognised by the College.

Candidates who are Licentiates of this College, or who may be registered Medical Practitioners, will require to produce Certificates of Attendance on the special subjects only, and will be examined in these only for the Dental Diploma.

EXAMINATIONS.

The Dental Examinations shall be both Written and Oral, and be conducted in the same manner as the ordinary Surgical Examinations. These Examinations shall consist of two separate sittings, and be held subsequent to each period of the Ordinary Examinations, on such days as the College may appoint. Candidates must apply to the Secretary of the College on or before the Saturday preceding the Ordinary Examinations, and must then produce all the required Certificates of having passed the Preliminary Examination, and of having attended the Lectures and other prescribed courses of instruction.

SUBJECTS OF EXAMINATION.

The ordinary subjects of Examination will be Anatomy, Physiology, Chemistry (including Metallurgy), Surgery, Medicine and

Materia Medica; and the special subjects will be Dental Anatomy and Physiology, Dental Surgery and Pathology, and Dental Mechanics. Anatomy, Chemistry (with Metallurgy), and Physiology, will form the subjects of the first Examination; Surgery, Medicine, Materia Medica, and the special subjects, those of the second.

TITLE AND DIPLOMA.

Those candidates who pass this Examination shall be entitled to the designation of Licentiate in Dental Surgery of the Royal College of Surgeons of Edinburgh, and shall obtain the Dental Diploma of the Royal College. Each candidate, before receiving his Diploma, shall, in entering his name in the books of the College, sign the following declaration:—

> I hereby promise faithfully to maintain and defend all the rights and privileges of the Royal College of Surgeons of Edinburgh, and to promote its interests to the utmost of my power. I promise, in the event of my admission as a Dental Licentiate of that College, to refrain from advertising or employing any other unbecoming modes of attracting business, and I shall not allow my name to appear in connection with any one who does so. I also promise to obey all the laws of the said Royal College, made or to be made.

FEES, ETC.

The fee for the Dental Diploma shall be ten guineas. Each candidate, for the first examination, shall pay to the Secretary of the College the sum of four guineas not later than nine a.m. of the Saturday preceding the ordinary examinations; and in the event of a candidate being unsuccessful, two guineas will be returned to him. Where the candidate is successful, the sum of four guineas will be considered as paid to account of the Diploma. Each candidate for the second examination shall pay to the Secretary of the College the sum of six guineas, not later than nine a.m. of the Tuesday preceding the second examination; and in the event of his being unsuccessful, three guineas will be returned to him. No candidate will, if unsuccessful, be remitted for a shorter period than three months. These Rules will apply to any subsequent rejection.

EXAMINATIONS SINE CURRICULO.

Candidates who were in practice before the first day of August, 1878, or those not in practice but who had commenced their apprenticeship as Dentists before the first day of August, 1875, and who are unable to furnish the Board of Examiners with the certificates of lectures and hospital attendance required by the foregoing regulations, shall fill in the schedule of application as follows:—

1. Full name, age and address of candidate.
2. Certificate of moral and professional character, signed by two registered Medical Practitioners.
3. The date of commencing practice or Apprenticeship as a Dentist, and whether, if in practice, such practice has been carried on in conjunction with any other business, and, if so, with what business.
4. Whether he has any Degree or Diploma in Medicine or Surgery, and if so, from what College or University, or other body, and at what time it was obtained.
5. The particulars of professional education.

The President's Council shall, on such information being afforded them, determine whether or not the candidate may be admitted to examination for the Dental Diploma, and such examination shall, with the exception of the preliminary examination, and the exemptions in favour of Registered Medical Practitioners, as before explained, be passed on the same subjects and in the same manner as is required for other candidates, and will confer the same privileges.

The following will be the periods of examination for the year 1884-85:—

I. PRELIMINARY EXAMINATIONS IN GENERAL EDUCATION.

These examinations will be held in October, 1885, April, July and October, 1886.

II. FIRST PROFESSIONAL EXAMINATIONS.

On Tuesday, October 6th, 1885.
On Tuesday, January 26th, 1886.
On Tuesday, April 13th, 1886.
On Tuesday, July 13th, 1886.

III. SECOND PROFESSIONAL EXAMINATIONS.

These will take place after the conclusion of the first professional examinations, at each of the above-mentioned periods. They will generally be begun on the Thursday succeeding the day of the first examination, and in no case on an earlier day.

SYLLABUS OF EXAMINATIONS.

In addition to a particular acquaintance with Dental Anatomy Physiology, and Surgery, candidates are expected to possess a general knowledge of at least the following subjects of examination :—

ANATOMY AND PHYSIOLOGY.

1. The Skeleton in general ; the anatomical characters and articulations of the Bones ; with the Muscles of the Inferior Maxilla and Upper and Lower Extremities.
2. Names and positions of the principal Blood-vessels and Nerves, and of the Viscera of the Chest and Abdomen.
3. General Anatomy of the Brain and Intercranial Nerves.
4. General knowledge of the functions of Circulation, Respiration, and Sensation.
5. An elementary knowledge of Histological Structures.

CHEMISTRY.

1. The Laws of Combination.
2. Sources or preparation and chemical properties of Oxygen, Hydrogen, Nitrogen, Carbon, Sulphur, and Chlorine.
3. A general acquaintance with the Chemistry of Potass, Soda, Ammonia, Iron, Lead, Gold, Copper, Zinc, Arsenic, and Mercury.

MEDICINE, SURGERY, AND MATERIA MEDICA.

1. The nature and treatment of Inflammation, Hæmorrhage, Asphyxia, Syncope, Wounds and Fractures ; along with an Elementary knowledge of Disease in general.
2. A general knowledge of the action of Narcotics, Emetics, Purgatives, Depressants, and Stimulants, with examples of the commoner substances used as each, and the modes of their prescription.

JOSEPH BELL, *Secretary.*

PROFESSIONAL EDUCATION REQUIRED BY THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The regulations of the Faculty of Glasgow do not materially differ from those of the Royal College of Surgeons of Edinburgh.

The Dental Examinations will be held on October 13th, 1885, January 19th, 1886, April 22nd, and July 6th.

The *Second Examination* will take place on the day following the First Examination.

ALEXANDER DUNCAN, B.A., *Secretary.*

PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

Every candidate for the License in Dentistry of the College shall produce evidence of having been registered by the General Medical Council as a student in medicine. Certificates of study will not be recognised by the College if the date of commencement of the course to which the certificate refers is more than fifteen days prior to such registration.

Every candidate for the License in Dentistry shall be required to pass a Preliminary Examination and three Professional Examinations.

PRELIMINARY EXAMINATION.

The regulations of the College which refer to the Preliminary Examination of the candidate for the Letters Testimonial (which see) shall apply to the candidate for the Dental License.

Candidates are strongly advised to pass in Physics at the Preliminary or Equivalent Examination.

PROFESSIONAL EXAMINATIONS.

The First and Second Professional Examinations shall be held in July and October of each year.

Should the Student fail to pass in July, he may present himself in October.

The Examination of each year must be passed before a new session can be entered on, but, in special cases, it shall be in the discretion of the Council of the College to permit the Student, for what appears to them sufficient cause, to commence a new year of study, and subsequently present himself for a supplemental Examination.

FIRST PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the First Professional Examination, to produce evidence of having been registered as a medical student by the General Medical Council, also to produce certificates of having subsequently attended—

Surgical department of a General Hospital, nine months.

Winter courses	Practical Anatomy, with Demonstrations and Dissections. Physiology. Surgery. Chemistry.
Summer courses	Practical Chemistry. Practical Physiology. Materia Medica.

The fee for this examination shall be £5 5*s*. Candidates who are rejected will be admitted to re-examination on paying an additional fee of £2 2*s*.

The subjects and order of this examination are identical with those of the Second Professional Examination for the Letters Testimonial of the College.

SECOND PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the Second Professional Examination, to produce evidence of having passed the First Professional Examination, also certificates of having subsequently attended—

Surgical department of a General Hospital, nine months.

Winter courses	Demonstrations and Dissections. Practical Anatomy. Surgery. Medicine.

The fee for this examination shall be £5 5*s*., and for re-examination, if rejected, £2 2*s*.

The subjects and order of this examination shall be identical with those of the Third Professional Examination for the Letters Testimonial of the College.

THIRD AND FINAL PROFESSIONAL EXAMINATION.

The Third Professional Examination shall be held in April, July, and October. The candidate is required, before admission to the Final Examination, to produce evidence—

a. Of having passed the Second Professional Examination; or of having obtained a diploma in Surgery recognised by the College.

b. Of having attended, subsequent to registration by the General Medical Council, the following courses of Lectures recognised by the College:—

Dental Surgery and Pathology	of each two courses.
Dental Mechanics	
Dental Anatomy and Physiology	One course.
Dental Metallurgy	

c. Of having attended for two years the practice of a Dental Hospital recognised by the College.

d. Of having been engaged in acquiring a practical knowledge of Mechanical Dentistry, for at least two years, in a public Laboratory recognised by the College; or for at least three years under the instruction of a Registered Dentist. The candidate shall also submit a piece of mechanical work certified to be of his own making.

The candidate holding a diploma in Surgery recognised by the College shall be required to produce certificates of one course of each of the above special Dental subjects, and of half the Hospital attendance and half the Laboratory work required from other Dental students.

As this remission has been made on the understanding that the Qualified Surgeon shall devote his whole time to the Dental work, the special Dental courses, Hospital attendances, and Laboratory work required from him, must all be taken out after the date of his diploma in Surgery.

FEES.

The fee for the Final Examination shall be, in the case of Licentiates in Surgery of the College, and for Dental students, £7 7*s*. For re-examination, if rejected, £4 4*s*.

For candidates holding a Surgical diploma other than that of the Royal College of Surgeons in Ireland, £12 12*s*. For re-examination, if rejected, £6 6*s*.

SUBJECTS OF EXAMINATION.

Candidates shall be examined in—

1. Dental Surgery—Theoretical, Clinical, and Operative.
2. Dental Mechanics—Theoretical and Operative.
3. Dental Anatomy and Physiology.
4. Metallurgy and Physics.

ORDER OF EXAMINATION.

FIRST DAY (PRINTED QUESTIONS).

Two hours shall be allotted to this examination. Three questions each in Dental Surgery, Dental Mechanics, Dental Anatomy, Metallurgy, and Physics shall be given. One question at least must be answered on each subject.

Candidates who have already passed in Physics at the Preliminary or Equivalent Examination shall be exempt from this subject at the Final Examination.

SECOND DAY (ORAL).

Each candidate shall be separately examined on each of the subjects of the first day.

THIRD AND FOURTH DAYS.

(Operative Dental Surgery and Mechanical Dentistry).

On these days the candidate's knowledge of Clinical Dental Surgery and Practical Operative Dentistry, and of Clinical Dental Mechanics and Practical Mechanical work, shall be tested. Candidates shall be examined at Hospital, and in the Dental Laboratory, and shall be required to perform operations on the model, and to carry out such mechanical work as the examiner shall direct.

REJECTED CANDIDATES.

No candidate for second or subsequent examination shall be admitted thereto who has not satisfied his examiners at previous examinations; but all candidates who have passed any examination shall get credit for the same when presenting themselves upon a subsequent occasion.

EXAMINATIONS SINE CURRICULO.

Candidates who were in practice before 1878, whose names are on the Dental Register, and who are unable to furnish the certificates required by the foregoing regulations, may be admitted to examination if they shall fill in the schedule of application as follows:—

1. The name, age, and address.

2. A certificate of his moral and professional characters signed by two Registered Medical Practitioners and by two Registered Dentists.

3. The date of his commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so, with what business?

4. Any certificate he may have of general education, or degree in Arts or Medicine.

5. The particulars of professional education.

The schedule of application, containing these particulars, shall be sent to the Registrar of the College, at least three weeks before the date of the examination; and the Council of the College shall then determine whether or not the candidate shall be admitted to examination for the Dental diploma. Such examination shall comprise the same subjects, and be conducted in the same manner as is herein set forth in reference to the Second and the Final Professional Examinations.

FEES.

The fee for this examination shall be £21; re-examination, if rejected, £10 10*s*.

DECLARATION TO BE TAKEN BY LICENTIATES.

The candidates entitled to receive the Dental diploma are required to attend upon such day as shall be notified to them, and to take a declaration.

They shall then sign the College roll, and shall receive their diplomas.

An enrolment fee of £1 1*s*. is payable to the Registrar of the College on the issue of the diploma.

These bye-laws shall come into effect from and after 1st day of August, 1884. But the Council of the College reserve the right of making such modifications, as may seem to them reasonable, in favour of students who shall have commenced their studies before that date.

REGULATIONS RELATING TO PROFESSIONAL EDUCATION AND EXAMINATIONS FOR THE M.R.C.S., AND L.R.C.P.

SECTION I.

PROFESSIONAL EDUCATION.

Any candidate who desires to obtain both the License of the Royal College of Physicians of London and the Diploma of Member of the Royal College of Surgeons of England is required to comply with the following Regulations, and to pass the Examinations hereinafter set forth. [*See* Section II.]

Every such candidate who shall commence Professional study on or after the First of October, 1884, will be required, at the times prescribed in Section II. for the respective Examinations, to produce satisfactory evidence:—

1. Of having been Registered as a Medical Student by the General Medical Council. [*See* Regulations of the General Medical Council, page 388; also to be obtained of the Registrar, 299, Oxford Street, London, W.]

   NOTE A.—Professional Studies commenced before Registration, except in the cases of Chemistry and Chemical Physics, Materia Medica, Botany, and Pharmacy, will not be recognised.

2. Of having been engaged in Professional Studies at least forty-five months, during which not less than three Winter Sessions and two Summer Sessions shall have been passed at one or more of the Medical Schools recognised by the two Colleges. One Winter Session and two Summer Sessions may be passed in one or more of the following ways:—

   (*a*) Attending the practice of a Hospital, Infirmary, or other Institution recognised as affording satisfactory opportunities for Professional Study;

   (*b*) Receiving Instruction as a Pupil of a legally qualified Practitioner holding such a public appointment, or having such opportunities of imparting a practical knowledge of Medicine, Surgery, or Midwifery, as shall be satisfactory to the two Colleges;

(*c*) Attending Lectures on one or more of the required subjects of Professional Study at a recognised place of instruction.

3. Of having received instruction in the following subjects :—
   - (*a*) Chemistry, including Chemical Physics, meaning thereby Heat, Light, and Electricity.
   - (*b*) Practical Chemistry.
   - (*c*) Materia Medica.
   - (*d*) Botany.
   - (*e*) Pharmacy.

   NOTE B.—The Instruction in Practical Pharmacy must be given by a registered Medical Practitioner, or by a member of the Pharmaceutical Society of Great Britain, or in a Public Hospital, Infirmary, or Dispensary.

4. Of having performed Dissections, at a recognised Medical School, during not less than twelve months.
5. Of having attended, at a recognised Medical School :—
   - (*a*) A course of Lectures on Anatomy during not less than six months, or one Winter Session.
   - (*b*) A course of Lectures on General Anatomy and Physiology during not less than six months, or one Winter Session.
   - (*c*) A separate practical course of General Anatomy and Physiology during not less than three months.
6. Of having attended, at a recognised Medical School :—
   - (*a*) A course of Lectures on Medicine during not less than six months, or one Winter Session.
   - (*b*) A course of Lectures on Surgery during not less than six months, or one Winter Session.
   - (*c*) A course of Lectures on Midwifery and Diseases peculiar to Women during not less than three months.

   NOTE C.—A Certificate must also be produced of attendance on not less than Twenty Labours, which Certificate must be signed by one or more legally qualified practitioners.

(*d*) Systematic Practical Instruction in Medicine, Surgery, and Midwifery, including:—

1. The application of Anatomical knowledge to the investigation of Disease.
2. The methods of examining various Organs and other Parts of the Body, in order to detect the evidence of Disease or the effects of Accidents.
3. The employment of Instruments and Apparatus used in diagnosis or treatment.
4. The examination of Diseased Structures, whether recent or in a Museum.
5. The Chemical Examination of Morbid products.
6. The performance of Operations on the Dead Body.
7. Post-Mortem Examinations.

(*e*) A course of Lectures on Pathological Anatomy during not less than three months.

(*f*) Demonstrations in the *post-mortem* room during the whole period of attendance on Clinical Lectures. (See Clause 8.)

(*g*) A course of Lectures on Forensic Medicine during not less than three months.

7. Of having attended at a recognised Hospital or Hospitals, the Practice of Medicine and Surgery during Three Winter and Two Summer Sessions.

Note D.—No Metropolitan Hospital is recognised which contains less than 150, and no Provincial or Colonial Hospital which contains less than 100 Patients.

A three months' course of Clinical Instruction in the Wards of a recognised Lunatic Hospital or Asylum may be substituted for the same period of attendance in the Medical Wards of a General Hospital.

8. Of having attended, at a recognised Hospital or Hospitals, during nine months Clinical Lectures on Medicine, and during nine months Clinical Lectures on Surgery, and of having been engaged during a period of Three Months in the Clinical Studies of Diseases peculiar to Women.

Note E.—These Clinical Lectures must be attended after the candidate has passed the Second Examination.

9. Of having discharged after he has passed the Second Examination, the Duties of a Medical Clinical Clerk during six months, and of a Surgical Dresser during other six months.

   NOTE F.—These duties may be discharged at a General Hospital, Infirmary or Dispensary, or Parochial or Union Infirmary, recognised for this purpose, or in such other similar manner as shall, in the opinion of the two Colleges, afford sufficient opportunity for the acquirement of practical knowledge.

10. Of having received Instruction in the practice of Vaccination.

Students are required to attend Examinations which are held in the several Classes.

N.B.—Exemption from any of the foregoing Regulations can only be granted by the Committee of Management.

NOTE G.—The Certificate must be such as will qualify its holder to contract as a Public Vaccinator under the Regulations at the time in force, of the Local Government Board.

SECTION II.

PROFESSIONAL EXAMINATIONS.

There are Three Professional Examinations, called the First Examination, the Second Examination, and the Third or Final Examination, each being partly written, partly oral, and partly practical.

THE FIRST EXAMINATION.

The subjects of the First Examination are:

Chemistry; and Chemical Physics, meaning thereby Heat, Light, and Electricity.
Materia Medica, Medical Botany, and Pharmacy.
Elementary Anatomy, and Elementary Physiology.

A candidate may take this Examination in two Parts at different times, or he may present himself for the whole at one time.

A candidate will be admitted to the Examination on Chemistry and Chemical Physics, Materia Medica, Medical Botany, and

Pharmacy, on producing evidence of having been registered as a Medical Student by the General Medical Council, and of having complied with the Regulations prescribed in Section I. Clause 3; but he will not be admitted to the Examination on Elementary Anatomy, and Elementary Physiology, earlier than the end of his first Winter Session at a Medical School.

The Fees for admission to the First Examination are as follows:—

For the whole Examination	£10 10s.
For re-examination after rejection in either of the two Parts	£3 3s.

THE SECOND EXAMINATION.

The subjects of the Second Examination are:—

Anatomy.
Physiology.

A candidate may present himself for Examination in either of these Subjects or Parts separately, or in both at one time.

A candidate will be admitted to the Second Examination after the lapse of not less than six months from the date of his passing the First Examination, on producing evidence of having completed, subsequently to registration as a Medical Student, eighteen months of professional Study at a recognised Medical School or Schools, and of having complied with the Regulations prescribed in Section I. Clauses 4 and 5.

The Fees for admission to the Second Examination are as follows:—

For the whole Examination	£10 10s.
For re-examination after rejection in either of the two Parts	£3 3s.

THE THIRD OR FINAL EXAMINATION.

The subjects of the Final Examination are:—

Medicine, including Therapeutics, Medical Anatomy, and Pathology.
Surgery, including Surgical Anatomy, and Pathology.
Midwifery, and Diseases peculiar to Women.

Questions on Forensic Medicine and Public Health will be included in the Third or Final Examination.

A candidate may present himself for examination in these Three Subjects or Parts separately or at one time.

A candidate will be admitted to the Third or Final Examination on producing evidence ;

1. Of being Twenty-one Years of age.
2. Of having passed the Second Examination.
3. Of having studied Medicine, Surgery, and Midwifery, in accordance with the Regulations prescribed in Section I. Clauses 2 and 6 to 10.

The Colleges do not admit to either Part of the Third or Final Examination any candidate (not exempted from Registration) whose name has not been entered in the Medical Students' Register at least forty-five months, nor till the expiration of two years after his having passed the Second Examination.

Any candidate who shall have obtained a Colonial, Indian, or Foreign Qualification which entitles him to practise Medicine or Surgery in the country where such Qualification has been conferred, after a course of study and examination equivalent to those required by the regulations of the two Colleges, shall, on production of satisfactory evidence as to age, and proficiency in Vaccination, be admissible to the Second and Third Examinations.

The fees for admission to the Third or Final Examination are as follows:—

For the whole Examination	£15	15s.
For re-examination after rejection in Medicine	£5	5s.
For re-examination after rejection in Surgery...	£5	5s.
For re-examination after rejection in Midwifery	£3	3s.

Every candidate who shall have passed the Third or Final Examination is, subject to the Bye-laws of the two Colleges, entitled to receive :—

The License of the Royal College of Physicians of London and

The Diploma of Member of the Royal College of Surgeons of England.

Forms of the required Certificates may be obtained of the Registrar of the Royal College of Physicians, or of the Secretary of the Royal College of Surgeons.

SPECIAL DENTAL SCHOOLS.

THE DENTAL HOSPITAL OF LONDON, LEICESTER SQUARE.

DENTAL ANATOMY AND PHYSIOLOGY.

By Arthur Underwood, M.R.C.S., L.D.S.Eng.—On Wednesdays and Fridays, at 8 a.m., during the Summer Session.

DENTAL SURGERY AND PATHOLOGY.

By S. J. Hutchinson, M.R.C.S., L.D.S.Eng.—On Tuesdays and Thursdays, at 8 a.m., during the Summer Session.

DENTAL MECHANICS.

By Joseph Walker, M.D., &c.—On Wednesdays, at 5 p.m., during the first half of the Winter Session.

METALLURGY.

By Prof. A. K. Huntington.—On Tuesdays and Fridays, at 12 o'clock, during the first half of the Winter Session.

Fees for two years' Hospital Practice and the Lectures, £31 10*s*.

MORTON SMALE, *Dean.*

NATIONAL DENTAL HOSPITAL AND COLLEGE, GREAT PORTLAND STREET.

DENTAL ANATOMY AND PHYSIOLOGY.

By Thomas Gaddes, L.D.S.Eng. and Edin.—On Tuesdays and Thursdays, at 7 p.m., during October, November and December.

DENTAL SURGERY AND PATHOLOGY.

By Willoughby Weiss, L.D.S.Eng.—On Tuesdays and Thursdays, at 6 p.m., during May, June, and July.

DENTAL MECHANICS.

By Harry Rose, L.D.S.Eng.—On Mondays, at 7 p.m., during January, February, and March.

DENTAL METALLURGY.

By Alfred Tribe, F.I.C , F.C.S.—On Tuesdays, at 6 p.m., during January, February, and March.

OPERATIVE DENTAL SURGERY.

By W. St. George Elliott, M.D., D.D.S.—On Wednesdays, at 7 p.m., during November and December.

DENTAL MATERIA MEDICA.

By Charles Glassington, M.R.C.S., L.D.S.Edin.—On Mondays, at 7 p.m., during October and November.

DEMONSTRATIONS IN DENTAL MECHANICS.

By W. R. Humby, L.D.S.Eng.—On Wednesdays, at 7 p.m., during January, February, and March.

THE ELEMENTS OF HISTOLOGY.

By Thomas Gaddes, L.D.S.Eng. and Edin.—On Wednesdays and Fridays, at 6 p.m., during May, June, and July.

ARTS AND LITERATURE CLASS.

Conducted by the Rev. H. R. Belcher, M.A., D.C.L.

Fees for two years' Hospital Practice and all the Lectures, £25 4*s*.

Thomas Gaddes, *Dean*.

OWEN'S COLLEGE AND THE VICTORIA DENTAL HOSPITAL, MANCHESTER.

Instruction adapted to the requirements of students preparing for the Dental Diploma of the Royal College of Surgeons of England and other licensing bodies is now given by Owen's College, in conjunction with the Victoria Dental Hospital, Manchester.

The Lecturers on Dental subjects are :—

DENTAL ANATOMY AND PHYSIOLOGY.

By Joseph Collier, M.B., B.Sc., M.R.C.S.—On Mondays and Fridays, at 2 p.m., during the Summer Session.

DENTAL SURGERY.

By Leonard Matheson, L.D.S.Eng.—On Mondays and Fridays, at 4.30 p.m., during the Summer Session.

DENTAL MECHANICS.

By Thomas Tanner, L.D.S.Eng.—On Thursdays, at 5 p.m., during the Winter Session.

The fee for two years' Dental Hospital practice is £12 12*s*.

The cost of the necessary courses for qualification (exclusive of the charge for parts in the dissecting room), together with the Infirmary and the Dental Hospital practice, is £79 12*s* 6*d*.

Dr. Parsons Shaw, *Warden*.

QUEEN'S COLLEGE, BIRMINGHAM, AND BIRMINGHAM DENTAL HOSPITAL.

The teaching of Dentistry is now undertaken by the Queen's College, acting in association with the Birmingham Dental Hospital and the Birmingham Clinical Board, so that Students may fully qualify themselves for the Dental Diploma of the Royal College of Surgeons.

The Dental Hospital is centrally situated, near the College, and is open daily (Sundays excepted). The number of patients treated in 1883 was upwards of 7,000.

DENTAL ANATOMY AND PHYSIOLOGY.

By F. R. Batchelor, L.D.S.I.—On Thursdays, at 5 p.m., during the Winter Session.

DENTAL SURGERY AND PATHOLOGY.

By Thomas Hawkins, M.R.C.S.—On Fridays, at 5 p.m., during the Winter Session.

DENTAL MECHANICS.

By Charles Sims, L.D.S.Eng.—On Wednesdays at 5 p.m., during the Summer Session.

DENTAL METALLURGY.

By W. A. Tilden, F.R.S., D.Sc.—This Class will be held at Mason College, at 2.30 p.m., from October till Christmas.

A Composition Fee of Sixty Guineas, payable in one sum, or in two sums, viz : Forty Guineas at the beginning of the first year, and Twenty Guineas at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (inclusive of the necessary Hospital Practice). Any additional attendance will be charged for according to the general conditions.

The Rev. W. H. Poulton, M.A., *Warden.*

UNIVERSITY COLLEGE, LIVERPOOL, & LIVERPOOL DENTAL HOSPITAL, MOUNT PLEASANT.

The entire curriculum can be completed at these two Schools.

Dental Anatomy and Physiology.—By E. T. Paul, F.R.C.S.

Dental Surgery.—By E. J. M. Phillips, M.R.C.S., L.D.S.Eng.

Dental Mechanics.—By E. A. Connell, L.D.S.Eng.

Dental Metallurgy.—By J. Roysdon, L.D.S.Eng.

Fees for Dental Hospital Practice.—Five Guineas per annum for all Students who are not taking out the full curriculum ; Four Guineas for full Students at these schools.

Composition Fee.—A payment of Fifty Guineas on entrance, or in two equal instalments (one-half on entrance and the remainder within twelve months), entitles the Student to attendance on all Lectures and Demonstrations (Medical and Special) required for the License of the Royal College of Surgeons of England. The fees for the Practice of the two Hospitals amount to £23 2*s*. The total expenditure for the whole curriculum is £75 12*s*.

Frederick Rose, *Registrar.*

DENTAL DISPENSARY AND SCHOOL, OCTAGON, PLYMOUTH.

Dental Anatomy.—By F. H. Balkwill, L.D.S.Eng.

Dental Physiology.—By C. Spence Bate, F.R.S., &c.

Dental Mechanics.—By W. V. Moore, L.D.S.Eng.

The Fee for Lectures and Dispensary Practice is £23 2*s*.

E. G. Bennett, *Hon. Sec.*

DENTAL HOSPITAL OF EXETER, BEDFORD CIRCUS.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma. Pupils of any Member of the Staff, or other Registered Practitioner (being a Life or Annual Governor), are permitted to attend the practice of the Hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the funds of the Institution.

Henry B. Mason, *Hon. Secretary.*

EDINBURGH DENTAL HOSPITAL AND SCHOOL, CHAMBERS STREET.

DENTAL ANATOMY AND PHYSIOLOGY.

By Andrew Wilson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 p.m., commencing in November. The course will consist of Twenty-four Lectures.

DENTAL SURGERY AND PATHOLOGY.

By George W. Watson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 p.m., during the Summer Session. The course will consist of Twenty Lectures.

MECHANICAL DENTISTRY.

By W. Bowman Macleod, L.D.S.Edin.—On Wednesdays, at 8 p.m., commencing in November.

PRACTICAL MECHANICS.

Assistant Demonstrator.—J. Stewart Durward, L.D.S.Edin. The Demonstrations will be spread over the two years of Hospital Practice, and will be given as occasion serves.

Fees: For Hospital Practice, £15 15*s.*; Lectures, £9 15*s.*; total, £25 10*s.* This does not include the fee of £2 4*s.* for second courses of lectures required by the Royal College of Surgeons of England.

W. Bowman Macleod, *Dean.*

ANDERSON'S COLLEGE, DENTAL HOSPITAL AND SCHOOL, GLASGOW.

DENTAL ANATOMY AND PHYSIOLOGY.

By David Taylor, M.D., L.D.S.Glas.—On Wednesdays and Fridays, at 8 a.m., during Summer Session.

DENTAL SURGERY AND PATHOLOGY.

By J. R. Brownlie, L.D.S.Eng.—On Tuesdays and Thursdays, at 8 a.m., during Summer Session.

MECHANICAL DENTISTRY.

By W. S. Woodburn, L.D.S.Glas.—On Thursdays, at 8 p.m. during Winter Session.

Fee for two years' Hospital Practice is £10 10s.; for the three courses of Dental Lectures £2 2s. each.

The Fee for the General Subjects is £25 14s. 6d.—Total, £42 10s. 6d. Dr. A. M. BUCHANAN, *Dean.*

DENTAL HOSPITAL OF DUBLIN, BERESFORD PLACE.

The Fee for Dental Practice is £3 3s. for one Session, and £5 5s. for two Sessions. H. G. SHERLOCK, *Hon. Sec.*

GENERAL MEDICAL SCHOOLS.

BARTHOLOMEW'S HOSPITAL, SMITHFIELD, E.C.

Fee for General Subjects for Students of Dental Surgery:—First Winter, 31½ guineas; First Summer, 31½ guineas; or a single payment of 63 guineas. Dr. NORMAN MOORE, *Warden.*

CHARING CROSS HOSPITAL, W.C.

The Composition Fee for Dental Students is £42 2s. This may be paid in two instalments of £22 2s. and £20, at the commencement of each Winter Session respectively.

Dr. J. MITCHELL BRUCE, *Dean.*

GUY'S HOSPITAL, BOROUGH, S.E.

Fee for attendance on the Hospital Practice and Lectures required for the Dental Diploma of the College of Surgeons, 63 guineas, or in two annual instalments of 40 guineas and 23 guineas. The above fee does not include £1 10s. for Practical Chemistry.

Dr. F. TAYLOR, *Dean.*

KING'S COLLEGE, STRAND, W.C.

No special arrangements are made for Dental Students.

Prof. CURNOW, *Dean.*

LONDON HOSPITAL, MILE END, E.

Composite Fee for Dental Students.—Hospital Practice and Lectures, £42. This does not include the Fee of £2 2s. for Practical Chemistry. MUNROE SCOTT, *Warden.*

MIDDLESEX HOSPITAL, BERNERS STREET, W.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite Courses of Lectures and Hospital Practice on payment of a fee of 40 guineas, in one sum on entrance, or by instalments of £30 on entrance, and £15 at the beginning of the second Winter Session.

Andrew Clark, *Dean.*

ST. GEORGE'S HOSPITAL, GROSVENOR PLACE, S.W.

Fee for General Subjects required for the Diploma in Dental Surgery, including Practical Chemistry, £55; payable in two instalments:—First year, £30; Second year, £25.

Dr. Wadham, *Dean.*

ST. MARY'S HOSPITAL, PADDINGTON, W.

Entrance Fee to the General Hospital Practice and Lectures required for the examination in Dental Surgery at the Royal College of Surgeons, England, £55; payable in two instalments:—First year, £30; Second year, £25.

George P. Field, *Dean.*

ST. THOMAS'S HOSPITAL, ALBERT EMBANKMENT, S.E.

The Fee for attendance on the General Subjects required of Students in Dental Surgery is, for the two years, £55; or by instalments, £50 for the first year, and £10 for the second year.

G. Rendle, *Secretary.*

UNIVERSITY COLLEGE, GOWER STREET, W.C.

No special arrangements are made for Dental Students.

Prof. Berkeley Hill, *Dean.*

WESTMINSTER HOSPITAL, BROAD SANCTUARY, S.W.

The Fees for the General Surgical Practice and Lectures required for the Dental Diploma of the Royal College of Surgeons may be paid in one of two ways, viz.:—1. In one payment on entrance, £50. 2. In two payments of £32 10*s.* and £20, to be made respectively at the commencement of each academic year. These payments include the Library Fee, and entitle the Student to attendance on the Tutorial Classes.

Dr. de Havilland Hall, *Dean.*

SCHOOL OF MEDICINE, SURGEONS' HALL, EDINBURGH.

The Fees for the General Subjects (including practice at the Royal Infirmary) required of Dental Students, according to the curriculum of the Royal College of Surgeons of Edinburgh, amount to £38 10*s*. STEVENSON MACADAM, *Secretary*.

ANDERSON'S COLLEGE, GLASGOW.

The Fees for the General Subjects required of Dental Students, as prescribed by the curriculum of the Faculty of Physicians and Surgeons of Glasgow, amount to £25 14*s*. 6*d*. And the Fees for the Special Dental portion of the curriculum, including £10 10*s*. for Dental Hospital Practice, are £16 16*s*.—total, £42 10*s*. 6*d*.

Dr. A. M. BUCHANAN, *Dean*.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. BOYD WALLIS, L.D.S.Eng., &c.

(Continued from page 303)

Efficiency and Durability of Incandescent Lamps.—The efficiency of different form of lamps refers to the quantity of energy consumed per candle-power produced. With a good gas engine, 21 feet of gas will develop one horse-power per hour, giving an efficiency of ·117, or more than double that of steam engines using 4 lbs. of coal per horse-power; this gas, at 16 candle-power, will represent 67·2 candle-hours of light. The gas engine driving a dynamo would work 12 lamps of 16 candles, or give about 200 candles of light. Thus the light-giving efficiency of the electric system is threefold that of combustion in this case, which is a fair comparison of similar lights. But *the cost of the electric light* is greater, as shown in this comparison; for the 21 feet of gas would cost only its current price, while to treble its yield of light by electricity would need the extra expense of the engine and dynamo, plus the necessary labour.

In the recent experiments carried out under the direction of a special committee of the Trinity House at the South Foreland

Lighthouse, the following results were obtained. The contested superiority of the three illuminants—gas, oil and electricity—was subjected to investigation in three experimental lighthouses, which were respectively fitted with new electrical apparatus, with Mr. Wigham's gas apparatus, and the six-wick oil burners in use in the Trinity Lighthouse service.

The electric light was produced from three arc-lamps of 12,000 candle-power each, by a current from three Meriten's electro-magnetic machines.

The gas light by four of Wigham's burners of 108 jets each, and each giving a light of about 2,400 candles.

The oil light by the Trinity Service six-wick burners, each yielding an 800 candle-power light, and a flame of 4½ inches diameter.

The superiority of the illumination of the electric arc for penetration of the atmosphere in foggy or hazy weather was established. In dense fogs off the Foreland, the electric rays became visible at distances varying from 1,900 to 1,500 feet. The oil and the gas have been detected together at from 1,500 to 1,250 feet.

The high temperature created by the combustion of the gas in the lantern was found a serious detriment. The gas light of four 108-jet burners raised the temperature to from 300 to 350 degrees Fahrenheit. At sea the rays of the oil and gas lights were lost at eight miles, whilst the range of the electric was maintained up to 14 miles.

The life of Incandescent Lamps has been greatly increased by the improved method of manufacture, from 800 to 2,000 hours, whilst many of Swan and Edison's lamps attain 3, 4, and even 5 thousand hours.

Herr Zacharias, in his experiments, found that a lamp of 10 candle-power (normal) would last as follows when giving—

Candle-power.	Hours.
10	5,550
12	2,857
15	1,292
16	1,000
20	443
30	163

In a series of experiments made at the Edison manufactory, Ivry, near Paris, with Edison's lamps of 16 candle-power, the average life was—

at 100 volts	1,000 hours.
,, 95 ,, ...	3,595 ,,

And when the lamps were run at an increased power the following results were obtained—

at 100 volts	1,000 hours.
,, 103 ,, ...	477 ,,
,, 105 ,, ...	284 ,,

An Edison B (eight-candle) lamp, in the electrical installation at Strasburg station, burned over 5,000 hours.

Heat and other effects of the Electric Light.—The incandescent lamp gives off less heat than an equal light derived from any process of combustion, and is said to give about one-tenth the heat of a gas light of equal power. Its influence upon the atmosphere is a matter of great importance from a medical point of view, for it generates no products, and has no ill-effect upon the health, books, pictures, artistic decorations, &c.

The conditions of life under all kinds of artificial light are less favourable to health than under daylight. We have abundance of soft, pure, white light during the day; the air we breathe is pure, and contains the heat only necessary for health. All animal and vegetable organisms flourish under the influence of sunlight, and our energies regain a state of activity during the day. Under artificial light these conditions are completely changed: the heat produced by all forms of light exceeds the temperature of the atmosphere in average daylight, and the air is vitiated to an extent proportional to the amount of light produced, except in the case of the electric light, which approaches nearest the conditions existing under sunlight.

All forms of artificial light hitherto in use depend on combustion, in order to sustain which a good and plentiful supply of air is necessary.

The following Table shows the amount of oxygen consumed the carbonic acid produced, and the air vitiated by the combustion of certain bodies burnt so as to give the light of 12 standard sperm candles, each candle burning at the rate of 120 grains per hour :—

Burnt to give light of 12 candles, equal to 120 grains per hour.	Cubic feet of oxygen consumed.	Cubic feet of air consumed.	Cubic feet of carbonic acid produced.	Cubic feet of air vitiated.	Heat produced in lbs. of water raised 10° F.
Common Gas	5·45	17·25	3·21	348·25	278·6
Sperm Oil	4·75	23·75	3·33	356·75	233·5
Paraffin	6·81	34·05	4·50	484·05	361·9
Sperm Candles ...	7·57	37·85	5·77	614·85	351·7
Wax ditto ...	8·41	42·05	5·90	632·25	383·1
Tallow ditto ...	12·00	60·00	8·73	933·00	505·4
Electric Light	none	none	none	none	13·8

When the supply of oxygen is insufficient, partial combustion only takes place, and the carbon escapes in an unburnt condition in the form of smoke.

These are very important considerations in the lighting of theatres and public halls. The presence of moisture and carbonic acid affects the sound-transmitting power of the atmosphere, and a row of gas footlights across the front of a stage produces a perfect screen of these gases, which are found to affect the transmission of the sound of voices or of music ; but this result is not produced when incandescent electric lamps replace the gas jets. These advantages were clearly illustrated at the Birmingham Musical Festival, in September, 1882, when 488 Swan lamps were employed for lighting the hall ; the result being that the temperature close under the roof was actually lower than on the floor of the hall, consequently the singers suffered no inconvenience from heat, and for the first time no case of fainting occurred, while the organ remained in tune throughout each performance ; but the absence of the heat which plays an important part in the ventilation of such buildings must be otherwise provided for.

But while the light of the incandescent electric lamp is so pure and free from injurious effects, it is otherwise with the arc light. Mr. Wills and Professor Dewar have ascertained that nitrous acid is produced by the arc, and, in addition to this, acetylene and prussic acid (chiefly at the positive carbon) are also generated. Mr. Wills collected 12 grains of nitrous acid per hour from an arc lamp. But it is believed that neither of these products escapes to any great extent, as probably they would be oxidized at the outer surface of the arc. Nevertheless, the nitrous products from the union of the nitrogen and oxygen of the air, and probably as a secondary result of the oxidizing of the prussic acid, must pass into the atmosphere, and their odour can be detected wherever arc lights are burned in enclosed and badly-ventilated spaces.

The Cost of Electric Lighting.— Important investigations have been made regarding the cost of the electric light produced, either with batteries or other means, but the results of these calculations are not yet sufficiently conclusive to be implicitly relied upon, as the cost must depend very largely upon the peculiar circumstances of individual cases; and, at present, lighting by electricity in London is a more costly method of illumination than lighting by gas. Dynamos have been brought to such a state of perfection that there is little chance of greater efficiency being found in them, though one may hope to see their prime cost materially reduced; and one cannot look for much advance in the economy of the engine and boiler. Therefore one must look for economy in the possible improvements of incandescent lamps. By working these lamps at high pressure, a greater economy of power can be obtained; but they then soon fail. From 140 to 200 candles can be obtained per horse-power, actually put into the lamps; and as much as 1,000 candles have been produced by one horse-power—but only for a short time, as the carbon filaments soon broke down. Therefore, the best field for economy is in the improvement of the carbons, so that they will stand a reasonable amount of current when pressed to their highest efficiency.

When compared on equal terms, it is evident that the electric light must at present be more costly than gas, the cost of which is already very low in London, and is likely to be still further reduced as the residual products become of greater utility and value. It is useless for those interested in the electric light to claim cheapness; its greatest recommendation is in its superior illuminating power, while being much less injurious to health than gas. This may in time cause it to be preferred, though its cost be double.

Looking at the question from this point of view, it is rather remarkable that the electric light has made such slow progress in this country, particularly so when one considers that in America the principal streets, warehouses, stores, and places of public resort in the leading cities, are brilliantly lighted by electricity. There are said to be upwards of 25,000 arc lamps in use in the

United States, and in New York the Edison central station alone supplies current for over 12,000 incandescent lights, and other larger central stations are in course of construction.

For isolated places, such as country houses where gas cannot be conveniently and cheaply made, the electric light may undoubtedly be cheaper; this specially applies to neighbourhoods where water power is available, or in factories where engine power already exists, for then the cost is reduced to the little extra fuel, and the capital invested on the dynamo and electric plant.

In this country domestic electric lighting is limited to the residences of a few enterprising gentlemen who have taken a great interest in the subject. Amongst these may be mentioned Mr. O. E. Coope, M.P., Mr. Swan, and Mr. Hammond. The experience of Mr. Coope with electric lighting at his country residence, Berechurch Hall, has enabled him to state that the expense is slightly under that he would have had to pay for gas, while the machinery and conductors are working as well as they did the first year they were put down. In addition to this, Mr. Coope has purified the air he breathes, while the steadiness, charm, and comfort of such a light, the durability of the house decorations, the absence of heat, and of all destructive gases, the non-vitiation of the air, and the better health one enjoys in consequence, make up a very desirable dividend on the capital invested.

Mr. Hammond, the electrician, has his house at Highgate illuminated by 71 Swan lamps of 20 candle-power nominal, distributed about the premises. The engine-room, which is in the garden, is provided with an 8 horse-power Otto gas engine, which makes rather over 150 revolutions a minute, and drives a Ferranti alternating-current dynamo at about 1,c00 a minute, excited by a small direct-current Siemens machine. No electrician or engine-driver is employed; but the gardener starts the gas-engine, and then leaves the plant to take care of itself. Mr. Hammond has a switch at the side of his bed, by which he can break contact and allow a weighted sluice-valve to fall, thus shutting off the gas from the engine, and putting out the lamps.

Last year the colour works of MM. Sordes et Huillard, at Suresnes, near Paris, were supplied with the electric light, upon the incandescent principle, to the extinction of about 800 gas flames, for which about 130 lamps have been substituted. The current is supplied by an Edison dynamo, which, at a speed of

1,050 revolutions a minute, gives out 110 volts at 90 ampères, while absorbing 16-horse power from one of the work's engines.

The two residences of the partners, which are near the works, are connected by a special circuit, and are provided with incandescent lamps on all the floors. The dynamo is kept running day and night, and the yearly expenses are stated to be £317, including interest on capital and sinking fund, while gas for the previous year cost £432.

From the Edison grand central station in New York, 587 subscribers are supplied, using altogether 12,764 lamps, served day and night. The price charged is the same as that which would be paid if gas were supplied at 7s. 9d. per 1,000 cubic feet. The price of gas is 9s. 2d. per 1,000 cubic feet.

This system is worked at a profit, and for the year 1884 yielded sufficient to pay a dividend of 3 per cent. on the capital invested. The earnings per lamp-hour were 1·04 cents, while the cost of production for the same period was ·75 cents. The average life of the lamps is about 477 hours. The average number of lamps per subscriber is twenty-one, and the average amount paid annually by each subscriber is £40.

The pretty little town of Bellegarde-sur-Valserine possesses an electric system, and a neighbouring waterfall is utilised to furnish an available force of about 2,000 horse-power. By a wise arrangement the subscribers are able to pay for the light at a sum per lamp, per hour, or per month, at the following prices:—

One 8-candle lamp	0s.	4d. per hour.
One 16-candle lamp	0s.	8d. ,,
Subscription per month ...	2s.	4d. per 8 candles.
Or	4s.	8d. per 16 ,,

The lamps are of the Edison type, and the streets are lighted with 16 candle-power lamps.

Messrs. Shoolbred & Co., of Tottenham Court Road, have employed the electric light in their establishment since 1879, and have submitted it to a hard practical test. Two eight-horse power engines, employed in the cabinet factory, are utilised to work two Gramme machines of 20 lights each, and some forty Jablochkoff lamps are employed. As a practical illustration of the successful manner in which electricity can be substituted for gas, it may be stated that in one of the rooms on the ground floor a single electric lamp does the duty formerly performed by 14 argand gas burners; and the temperature of this room (70 feet long by 50 feet wide), which was formerly abnormally high, is now greatly reduced, much to the advantage of the health of the employés, while the goods no longer suffer from the deleterious influence of the gas; and as regards the financial results, Messrs. Shoolbred & Co. express themselves perfectly satisfied.

From calculations in reference to the cost of the electric light made in 1882, the following summary has been made, which gives the approximate relative cost of producing a light equal to 1,000 standard candles:—

	Per hour.
Gas (at 2s. 9d. per 1,000 cubic feet)	10¼d.
Arc lamps, worked singly	6d.
Ditto worked four or five together ...	4d.
Ditto in large installations	3d.
Incandescent lamps	12d.
Ditto ditto, small installations, with gas engine	15d.
Semi-incandescent lamps, or electric candles	6d. to 8d.

According to experiments made at Lyons during 100 hours by Lacassagne and Thiers, for the lighting of the Rue Imperial, which required a battery of 60 Bunsen cells, the cost amounted to about three francs per hour for a light equivalent to a mean of 50 carcel lamps. This cost is nearly the same as that calculated by Becquerel from the actual expenditure.

According to Regnier, the cost of the electric light with incandescent lamps may be reckoned as follows for each carcel lamp per hour:—

	fr. c.
With a Bunsen battery (Ruhmkorff's form) ...	0·122
With a Thompson battery (large size) ...	0·062
With a bichromate of potassium battery, with porous vessels, chloride of ammonium and mercury (Goarant and Tromelin's form)...	0·180

In order to obtain a current equivalent to that from eight Bunsen cells (Ruhmkorff's form), giving a light of from 6 to 12 carcel lamps, 45 Thompson cells, or 24 Goarant and Tromelin cells, would be required.

These figures go to show that the economical solution of the problem of electric lighting is not to be found in batteries of this description.

EDINBURGH DENTAL STUDENTS' SOCIETY.

ANNUAL DINNER.

The First Annual Dinner of the Edinburgh Dental Students' Society was held in the Albert Hotel, Edinburgh, on the evening of Friday, the 17th July. Mr. W. Bowman Macleod presided, and Mr. Edwin A. Cormack acted as croupier. There were about fifty gentlemen present.

After the loyal and patriotic toasts, the Chairman proposed "The Edinburgh Dental Students' Society." In doing so, he said that it was fully five years since the Dental School was established in that city. It had begun with two or three students, but it had so increased in the number of the students it was thought the proper time had come when they should form a society which should have for its objects the consideration of matters generally and specially pertaining to dental science, the advancement and welfare of its members, and the facilitating of social intercourse among the students attending the Edinburgh Dental School.

The formation of a Dental Students' Society was one which, he ventured to predict, would do the members themselves good, and would do the profession to which they aspired a vast deal of good indeed. In that Society they would meet together at stated periods, and contribute to each other's knowledge by exchanging facts which they had observed in the course of their studies at the hospital. But whilst they gained vast knowledge by this interchange of ideas, they would gain a good deal also by having the opportunity of acquiring the habit and skill of expressing concisely and explicitly the ideas which teemed in their brains, and he had no doubt that many gentlemen around that table much older than students felt, when called upon to speak in public, the want of this practice, and wished that in their young days there had been a Dental Students' Society, on the floor of which they might have discussed the various topics which were interesting to them as dentists, and so have been enabled then to acquire a facility of expressing themselves in such a way as would not only be intelligible, but interesting, to their fellow-men. Such a training, moreover, made men acknowledge the fact that there might be a difference of opinion without any unfriendship. It enabled them to speak with that clearness, and with that command of temper, which alone could command a patient and respectful hearing. Then the coming together on stated occasions in a social capacity, although of minor importance, very often cemented the friendship which otherwise, at the breaking up of the session, or at the termination of the student's career, would be allowed to become dormant. From the fact that the school had been firmly established before the society had been called into existence, and that there was a sufficient number of students to give it cohesion and independent life in the present, he augured that there would be little difficulty in keeping up the life and vigour of the Society in the future. He wished the Edinburgh Dental Students' Society long life and prosperity, and a career of usefulness.

Mr. E. A. Cormack, in reply, said that the principal aim of the Society was the advancement of dental science, and they meant to attain that in many ways. They intended to invite the leading men throughout the profession, not only in the United Kingdom, but also in the United States, to furnish them with papers on their different specialties, and they hoped a number of them would be found willing to aid them in this respect. They looked forward to the discussion of those papers with great expectations of gaining a great deal of information and enduring benefit.

In a conversation the other day, Dr. Smith had said to him that he hoped they would not fall into the same error which was common to so many societies of all kinds, viz., that of allowing a few men to monopolise to themselves the most of the debating. Now, that was very far from their purpose. They intended and they were determined to keep the younger men well forward. They intended to ask them to take part in every discussion. He, for his part, would use such measures as to leave no room for doubt that they had the interest of the juniors at heart. They were required by their rules to have a conversational meeting at least once during the session, in which the younger members were expected to come up with all the cases of interest that might have been brought before them during the session.

Mr. Amoore, as a member of the Students' Society of the Dental Hospital of London, begged to thank them for the kindly feeling evinced, through Mr. Rose, in proposing the kindred societies. Those societies being limited, so far as he was aware, to the one already mentioned and that of the National Dental Hospital of London, and he might include, perhaps, the one in Glasgow, though he believed that one was more of the nature of an old students' reunion than a Students' Society proper. He could testify personally to their great value, bringing them as students together, and teaching them to discuss matters of professional interest publicly, and, among many other things, learning the art of differing entirely with another individual without getting warm upon the subject—sometimes, by the way, a most difficult thing to do. He thought that a dentist, more especially than the members of any other profession, needed some such training. Being as a rule accustomed to perform certain operations in a particular way of their own, they came to think that they could not be done properly in any other, and that their method was the right way and the only way. Mr. Amoore then instanced a difference of opinion arising between two gentlemen at a meeting, with unpleasant personalities consequent upon it, and concluded his remarks by saying that if those two practitioners—both of them, possibly, very able men—had, in the days of their student-hood, belonged to some such society as that one whose birth they were inaugurating that night, no such performance would have been enacted, as they would probably have seen or experienced something of the kind in earlier days, at a time when such a split was of no moment, and then and there mentally resolved to fight shy of it in the future.

Dr. Brewis proposed "Success to the Edinburgh Dental Hospital." He considered, he said, the Edinburgh Dental Hospital and the teaching which they had established within its walls, a great addition to the medical schools. They all knew the fame of the Edinburgh Medical School, and he was sure that the Edinburgh Dental Hospital would do its part in advancing that branch of medical science to a high degree, and that they would do their share in adding to the lustre of the Medical School. He knew of two men of their profession who had occupied the highest professional position it was possible for them to occupy. He referred to Dr. Smith and Dr. Imlack, as Presidents of the Royal College of Surgeons of Edinburgh. So far as he knew, dentistry was yet in its infancy, and it was only by the establishment of such schools as these that they could bring out an advanced dental science. He thought that every medical man who intended to enter the army or the navy, or to go into the country, should have a fair knowledge of dentistry, that they might not entirely destroy the mouths of their poor unfortunate patients.

Mr. J. Leslie Fraser replied, and other toasts followed.

VIVISECTION.

Dr. Lauder Brunton, in his new and excellent book on "Pharmacology, Therapeutics, and Materia Medica," writes as follows upon experiments upon animals:—

"*Objections to Experiment.*—Some people object entirely to experiments upon animals. They do this chiefly on two grounds. The first is, that such experiments are useless; and the second that, even if they were useful, we have no right to inflict pain upon animals.

"The first objection is due to ignorance. Almost all our exact knowledge of the action of drugs on the various organs of the body, as well as the physiological functions of these organisms themselves, has been obtained by experiments on animals.

"Their second objection is one which, if pushed to its utmost limits and steadily carried out, would soon drive man off the face of the earth.

"The struggle for existence is constantly going on, not only between man and man, but between man, the lower animals and plants, and man's very being depends upon his success.

"We kill animals for food. We destroy them when they are dangerous, like the tiger or cobra; or destructive, like the rat or mouse. We oblige them to work for us for no reward but their food; and we urge them on by whip and spur when they are unwilling or flag. No one would think of blaming the messenger who should apply whip and spur to bring a reprieve, and thus save the life of a human being about to die on the scaffold, even although his horse should die under him at the end of the journey. Humane people will give an extra shilling to a cabman in order that they may catch the train which will take them to soothe the dying moments of a friend, without regarding the consequences to the cab horse. Yet if one-tenth of the suffering which the horse has to endure in either of the cases just mentioned were to be inflicted by a physiologist in order to obtain the knowledge which would help to relieve the suffering and lengthen the life, not of one human being only, but of thousands, many persons would exclaim against him. Such objections as these are due either to want of knowledge or want of thought on the part of people who make them. They either do not know the benefits which medicine derives from experiment, or they thoughtlessly (sometimes, perhaps, wilfully) ignore the evidence regarding the utility of experiment."

GOSSIP.

THE death of Mr. Charles T. Stent occurred on July 17. Deceased was 78 years of age. It is understood that his two sons will conduct the business in connection with the manufacture of the impression composition.

THE following appointments have been made to the Dental Hospital of London:—Mr. Storer Bennett, F.R.C.S., L.R.C.P. Lond., L.D.S.Eng., has been appointed Dental Surgeon *vice* Mr. S. J. Hutchinson, resigned; and Mr. William Hern, M.R.C.S., L.D.S.Eng., has been appointed Assistant Dental Surgeon: House Surgeon, Mr. J. C. Vipond-Crocker, L.D.S.Eng.; Assistant House Surgeon, Mr. H. Lloyd Williams, L.D.S.Eng.; Deputy Assistant House Surgeon, Mr. Charles F. Rilot.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London and the Birmingham Dental Hospital, from July 1st to July 31st, 1885:—

		National.	London.	Birmingham.
Number of Patients attended ...		1,671	--	932
Extractions	Children under 14	341	416	706
	Adults	533	950	
	Under Nitrous Oxide	578	560	19
Gold Stoppings		63	303	6
Other Stoppings		606	841	231
Advice		274	93	—
Irregularities of the Teeth ...		257	96	—
Miscellaneous		142	330	32
Total... ...		2,794	3,589	994

THE Council of the Royal College of Surgeons in Ireland have, chiefly through the influence of the Representative Board of the British Dental Association, removed from the roll of Licentiates in Dental Surgery of the College the name of an extensive advertiser.

THE *Lancet* refers to a curious case of prolonged catalepsy, details of which are published in *La Enciclopedia Habana.* The cataleptic condition has existed for fourteen months in a Spanish soldier, aged 22. The body remains in any position in which it is placed, the eyelids quiver constantly, and the facial muscles contract so as to give somewhat the appearance of dementia.

THE Annual Meeting of the British Dental Association has again been a success. In the next number of the *Dental Record* will appear our report of the meeting.

A PRISONER now in Swansea Gaol had tried to kill himself, and a bullet remained in his body. After tracing its direction, the surgeons painted the wound with cocaine, cut into the patient's back two inches deep, and extracted the bullet, with, it is said, no sign of consciousness on his part more acute than "wincing."

THE expressed black acrid juice obtained from the nut of the *Semecarpus anarcadium* is employed in India as an indelible marking-ink, and is applied on all kinds of cotton goods. The colour is fixed with quicklime. This juice is soluble in alcohol, fixed oils, and diluted alkali, but not at all so in water. The berries of the *Koligarna longifolia* also contain a similar black juice. It was from a mixture of these two juices, says the *Midland Medical Miscellany*, that the shields, which were made at Silhet, in Bengal, and which were celebrated throughout India, were coated. It formed a hard, black, impenetrable varnish. This varnish is prepared by macerating the nuts and berries in clear water for a month, then cutting them transversely, and pressing them in a mill. The expressed juice of each is kept for several months, taking off the scum from time to time, then decanted. When used, two parts of the former are mixed with one part of the latter, and applied as a varnish. When dry it is polished with an agate or smooth pebble. It becomes exceedingly hard, and prevents destruction of wood by the white ant.

IT is stated that in Russia the works of Darwin, Spencer, Agassiz, Huxley, Lewes, and others, are forbidden to be issued from circulating libraries.

THE

DENTAL RECORD.

VOL. V. OCTOBER 1, 1885. No. 10.

BRIDGE WORK.

By R. H. Mecredy, D.D.S.

The subject of bridge work is one that has been occupying a considerable amount of attention in Dental circles lately, and has met with more or less condemnation at the hands of some of our most eminent dentists. In fact I doubt if, amongst "the old school," it has one single advocate.

I do not claim to champion bridge work upon a large scale, but in certain cases there is no doubt in my mind that it is very applicable. I speak of such cases where, for instance, a patient has been unfortunate enough to have lost four of the six upper incisors, but with some of the stumps still remaining; a very common occurrence, and one frequently met with by every practitioner. The question at once arises: What is to be done? In a great many instances "dentists" are in the habit of filing down the stumps level with the gum, and inserting a plate over them. Instead of doing this, cannot we still retain those stumps to the patient's advantage, and utilize them as the foundation of "a bridge" that will at once combine all the cleanliness of a plate, and be at the same time removable?

I believe I have hit upon such a "bridge," and have applied it with much success and comfort to the patient. I am convinced that there is no denture made that has to rely upon any of the various cements that will successfully withstand the fluids of the mouth, and therefore must collect secretions, and become both offensive and injurious to the wearer.

After having practised the Richmond method for some time, I have finally abandoned it, my chief reason being that it is not removable; and I have substituted in its place a mode of procedure which, as applied to "bridge work," so far as I am aware, has emanated from myself.

My means of applying a removable bridge is this:—I use the "Balkwill mode of crowning" for each of my anchorages, and back the intervening teeth with gold; this at once gives all the advantages claimed for "the Richmond," with the additional one of being removable, and capable of being cleaned as often as the patient likes.

It will not be amiss to state in detail here my mode of procedure, as the application of my crowns are slightly different from the original Balkwill method.

Let us suppose we have a mouth with the canine of one side missing, but with two or more stumps remaining, and the space extends, we will say, to the first bicuspid on the opposite side. We will utilize the stump of the canine from which we started as one anchor, and, we will say, that of the opposite side central; should there still be another stump we can also use that, and so make our bridge more rigid. In a case such as I quote a bridge has been successfully applied by me.

It is necessary for the entire success that every detail from the starting point to the conclusion be carried out with the utmost care and precision.

First of all I prepare my roots which are to serve as anchorages for my bridge. To do this I slightly deviate from the Balkwill screws we buy at the "depôts." I usually make my own tubes, because, in some instances, I find those we buy are not quite long enough, and I like to make the gold head of my tube cover as much as I possibly can of my root, so as to give it all the protection available.

Having obtained such a tube, I next drill my worm in the stump, countersinking the head well.

Everything thus far advanced to receive the metal tube, I then apply my permanent dressing to the apex of the root. I then mix up a little palladium very soft. I prefer this to any of the other amalgams, as it sets at once, so doing away with any possibility of after movement. Just before inserting the tube I coat the outside (screw side) well with it, then screw home at once while yet soft, then after about five minutes trim off the surplus palladium, and cut down the remaining portion of the stumps well below the level of the gum both on the lingual and labial aspects, leaving, however, the centre of the stumps slightly convex, to prevent any tendency to rotary movement on the part of the "artificial teeth."

Now, having both anchorages prepared and ready to receive the bridge, I next proceed to take the impression. This is a matter of some difficulty—to take an absolutely correct mould—and, in doing so, great care must be exercised not to loosen or move the pins in withdrawing the plate, for should you not succeed in removing the cast with the pins perfectly parallel, your impression is useless To obviate this difficulty, I have an assistant ready by the chair with a cup of soft composition, and I then quickly cover over two small pieces of brass wire (previously bent at right angles so as to clear the bite), with just the slightest particle of composition, and press them quickly up to my tubes, working the material (Stent's) well round the stumps, so as to be sure all the portions of the composition come in contact with them ; then, quickly, and while the material is quite soft, I receive the impression cup from the assistant and press it home and leave it there until absolutely cold, to preclude all possibility of dragging in withdrawing the impression cup. Having selected my teeth, I then dismiss my patient, and the rest of the work, with the exception of fine fitting, I have done in the laboratory. So that I may give to the root to be pivoted all the protection possible, I always have a small piece of gold plate, very thin (and I prefer coin), struck up so as to just cover, but no more than do so, the stumps, having the edges of the gold bevelled carefully down both on the lingual and labial sides. I then fit my anchor teeth down first and try them in the mouth, to see that everything connected with them is correct, and that my pins are exactly parallel. Should everything be right, I then proceed and back my intervening teeth, tack them together lightly with solder (No. 1), and replace in the mouth, so that, if any of the teeth have moved out of place in the plaster, I can easily replace them, dividing with a saw.

After finally fitting in the mouth and being assured every tooth is in position, I then solder them permanently, flushing them well with solder, and passing a half round gold wire from one tooth to the other for additional strength, polish up, and then all is complete for the mouth.

Before finally inserting, I dry out my tubes in my stumps with chloroform, keeping a napkin round them ; then with the point of my penknife or an excavator I open the slit in my pins and push the bridge gently but firmly home. I generally leave the bite slightly high for twenty-four hours, so that my denture may work itself well into place, and then if I still find my bite high I trim up with the engine in the mouth ; my operation is now complete.

Should any trouble arise in the pivoted stumps, this kind of bridge will allow of immediate removal, and will act as a drainage tube ; whereas, on the other hand as well, I use as large tubes as the roots will permit, and it is a simple thing to remove a dressing in this way.

I find from experience these bridges hold in beautifully in the mouth, take up absolutely no room, are cleanly, easily adjusted and removed, and so can be kept perfectly clean.

Should it happen that your patient lives at a distance, with slight tuition you can instruct intelligent patients how to remove them for cleaning purposes, which will not be often found necessary, owing to the completeness of the fit and the precautions taken for the protection of the stumps.

I find the holding power of these pins quite sufficient to preclude any possibility of the appliance falling out, but not so much so that the patient, after having been properly instructed cannot remove them when necessary. I also caution my patients to be most particular in keeping them clean by syringing in between the teeth daily with a fine nozzle syringe.

I find in single pivot cases that this mode of pivoting is more cleanly and easy of application than any other method practised by me. I have had experience with most of the modern and some of the old methods of pivot work, and in the majority of cases I am certainly in favour of this method, where cleanliness is paramount.

Bridge work upon a large scale I cannot condemn too much, as being an imposition upon the public ; it is very expensive, never durable, and always dirty ; but in small cases of from two to six teeth I find them at once useful and ornamental, and to public speakers and singers beyond price.

BRITISH DENTAL ASSOCIATION.

WESTERN COUNTIES BRANCH.

THE Seventh Annual Meeting of this Branch of the Association was held in the Free Library, Hereford, on August 24th, Mr. W. A. Hunt, the President, in the chair.

Mr. H. B. Mason, the Hon. Sec., read the following report of the Council:—

The Council have pleasure in presenting this report to the Seventh Annual Meeting of members.

The meeting last year at Torquay, although from various causes not so largely attended as some previous ones—several of our more prominent members being on their way to attend the meeting of the British Association in Canada—was nevertheless very successful. In addition to the President's Address, papers and notes of cases were read by Messrs. W. V. Moore, G. B. Pearman, F. H. Balkwill and E. L. Keys; and demonstrations given by Mr. Browne-Mason, Mr. Verrier and Mr. Briggs.

During the year ten gentlemen have ceased to be members of the Branch, four having been removed from the list of the Central Association for non-payment of subscriptions, one by the Branch for the same reason, four have resigned, and one has died. The Council have, including to-day, elected seven new members, and the number now on the list is seventy-five. The Council have met once since the Torquay meeting, at Bristol, in April, but the only matter before them which requires comment was a communication from the Hon. Sec. of the Dental Benevolent Fund, inviting the Branch to form a local committee of the Fund, and this it was decided to leave for the consideration of the meeting to-day.

The Council have had it suggested to them that it would tend to the increased usefulness and popularity of the Branch if the transactions were published separately for circulation amongst the members. They will be glad to hear the opinion of the meeting on the subject.

The Council propose that the next annual meeting be held in Exeter, with Mr. J. T. Browne-Mason, of that city, as President.

The Treasurer (Mr. J. T. Browne-Mason) reported that the receipts, including a balance of £12 3s. 5d. from last year, amounted to £29 8s. 5d. and the expenditure during the year had amounted to £17 6s. 8d., leaving a balance in hand of £12 1s. 9d.

The Secretary then read a letter which he had received from Mr. Oakley Coles, the Hon. Secretary of the Dental Benevolent Fund, who stated that he had been requested by the Managing Committee of the Fund to write to the Hon. Secretary of each of the Branches of the Association, and suggest that the President, Treasurer and Hon. Secretary of the Branch should form themselves into a local committee of the Benevolent Fund. He hoped that the executive of the Western Counties Branch would be able to accede to this suggestion.

Mr. R. Rogers said he had great pleasure in proposing that the suggestion be adopted by the Branch. He was quite sure that the Fund would prove a great benefit to the poorer brethren, and it ought certainly to be much better supported than it had been. He himself knew of several cases in which great benefit might be conferred upon really deserving members of the professsion if only the Fund was large enough for the work it ought to do.

Mr. C. A. Hayman seconded the resolution, and asked for some information as to the way in which relief was to be given, and the amount which would be voted to a deserving case.

The President said the Fund had at present an invested capital of £600, and an annual income from subscriptions of about £200; that was the extent of its capabilities for relieving distressed brethren. Perhaps Mr. Parkinson could give some further information.

Mr. Parkinson said that at present the Fund was not nearly large enough to meet the demands made upon it; members would be surprised at the cases which came before the Committee. Unfortunately his mouth was sealed as to the recipients of relief; but if by the exercise of local influence they could obtain additional subscriptions it would be a great thing.

Mr. Balkwill said he supposed one object of these officers being appointed was that they would be able to exercise some discretion in local cases.

Dr. Waite said he believed the primary cbject was to obtain information from the officers of the Branches with reference to cases in distant parts of the country, as to the merits of which the Committee could have no personal knowledge. With reference to Mr. Hayman's question, he might state that in several cases the Committee had found it a wise course not to give money at all, but to provide for the education of orphans, and afterwards to provide such boys as thought of entering the dental profession with the means of obtaining a diploma; many of the dental hospitals had agreed to give instruction free in such cases.

Mr. A. G. Levason remarked on the indifference with regard to the Fund which appeared to prevail. Considering that there were nearly three thousand members of the profession practising in the United Kingdom, £200 a year seemed to be a very poor amount to be received for such an excellent object.

The President suggested that members might pay a small subscription to the Benevolent Fund annually with their subscription to the Branch, the former being handed over in bulk by the Treasurer of the Branch to the Committee of the Fund. He thought this would be a simple and practical arrangement.

The resolution was agreed to.

A discussion ensued upon the suggestion that the work of the Branch should be published in a separate volume to be called "The Transactions of the Western Branch of the British Dental Association," it having been thought the reports in the Association *Journal* were not sufficient to meet the ends they had in view. The matter was allowed to stand over till next year.

The President delivered a short VALEDICTORY ADDRESS. He said:

A year had passed since he offered them his congratulations on their meeting together once more to cement good feelings and deepen the foundations for further profitable and social intercourse. He thought meetings held oftener than once a year, and of a shorter and less formal nature than their annual meeting, would be most desirable, yet on the other hand their Branch stretched over such a wide area, and its membecs lived so far apart, with but few thickly populated districts near them, that at present more frequent meetings seemed impossible. Nevertheless he thought they had made progress.

A practitioner whom he was urging to join the Branch once said to him, "But when I have paid my subscription what shall I get out of it." Truly that remark had a strong flavour of selfishness about it. His reply naturally was, "Your first duty is to be anxious to see what you individually can contribute to the general good." Did they not all owe a heavy debt of gratitude to the generous labours of those who had gone before them, and were they selfishly to absorb all that useful knowledge for their own personal ends and never take the trouble to contribute one iota in return? No, verily; such a sentiment was quite unworthy of, and quite out of character with, the true spirit which should govern the members of a body which they were striving to consolidate into a scientific and liberal profession. On the other hand, he could assert without fear of contradiction that never had a man acted towards his brethren on the lines just laid down without advantages of various kinds, direct or indirect, resulting to him. Even in the short history of their own Branch every man there could, he believed, speak of many a friendship formed, many pleasant and valuable introductions made, many a valuable paper listened to, many valuable hints received, and much valuable knowledge gained. He would, then, repeat the advice he had given last year. Let them strive by every means to advance, not only the branch of the profession which they had chosen, but also their own individual culture; they would thus enjoy the greatest pleasure which upright and honourable minds could conceive, viz., that of increasing the usefulness and raising the condition and respectability of the body to which they belonged.

It was not his intention to detain them longer, but he had still the grateful task of calling their attention to the valuable services rendered to the Branch by their Hon. Secretary, Mr. Henry B. Mason, and by their respected Treasurer, Mr. Browne-Mason, of thanking them all for the kindness with which they had supported him during his Presidentship, and of vacating the chair with the knowledge that it would now be occupied by so able a man as his friend Mr. McAdam.

Mr. Spence Bate proposed a vote of thanks to the President for his services, observing that he was himself an embodiment of the sentiments he had expressed in his address; he did not know any one of their body who had shown a more unselfish character than Mr. Hunt.

Mr. Parkinson seconded the resolution, remarking that he fully endorsed what Mr. Spence Bate had said.

Mr. Hunt having briefly expressed his acknowledgements, vacated the chair, which was taken by Mr. McAdam, who proceeded to deliver the following INAUGURAL ADDRESS:—

Gentlemen,—The first duty I have to perform is to express my high appreciation of the honour you have conferred upon me in electing me as your President. That you could have chosen one more fitted for the office will, I am afraid, be only too obvious to you at the end of my presidential year, but that you could have determined on a better city than Hereford to hold this meeting in I am loth to admit. I give you all a cordial welcome to its ancient walls, alas, now all but removed by the sanitary but destroying wave of street improvements. Hereford is one of the five most ancient cities in England. It is mentioned that the city was in existence even before the year 676, for during the reign of Penda, King of Mercia, who had embraced Christianity, a synod was held here for the purpose of creating a new see. Although agreeing with the place of meeting, I think we are very unfortunate in the date. Owing to its close proximity to the annual meeting of the parent association, we have been robbed of the presence of all but one of the London men who have heretofore honoured us with their company. With these few remarks I feel very much inclined to stop. I hesitate to address you when every subject on which a president might dilate has been so thoroughly thrashed out in former addresses. It is almost impossible to avoid the stigma of plagiarism in opening one's mouth before those who have attended not only all of our meetings, but those also of the parent and kindred societies. There is, however, one subject that I have at heart, which is to defend the Association from the charge brought against it of being a mutual admiration society. The class of individuals who bring this accusation are those who are content to live and work on in the narrow sphere of self-sufficiency—having no wish to be on friendly terms with their fellow-workers, and valuing as nought the scientific intercourse which they designate as "shop." I hold that in no branch of surgery is it so desirable that those who are practising it and who love it should meet together for the purpose of comparing their views and researches and debating on them. Some of us may have fully embraced Sewill's doctrine of the etiology and pathology of dental caries, others may still believe in a "Retrograde Metamorphosis." Again, there are the advocates of the electric mallet and cohesive gold, who will find opponents who are true to hand-pressure and cylinders. Discussions on these methods and on incidents of office practice, and the exhibition of many little inventions often apologised for by the inventor as being thought by him too trivial to mention, but which have often effected an immense saving of time, are very valuable to the dental surgeon. It is, however, not so much in papers or essays that we learn what we most want, but by our casual chit-chat on our excursions, in the smoke room, anywhere, in fact, where we are in private. These are our objects, and these only, in gathering together year by year, and by these means the public will surely begin to see that we work for other reasons than mere pecuniary ones, and that they, in the long run, will be partakers with us in the good that accrues. I cannot refrain from quoting the words of Sir William Jenner, with which I was so much struck when hearing him deliver his address at the opening of the International Medical Congress of 1881. He said in conclusion, "We are here to spread the truths we know, and to learn from others the truths they have to tell. We are here to give our knowledge freely, and to receive from others as freely the knowledge that they can bestow, and in the giving as well as in the receiving we shall increase our own store. We are here to thrash out the corn of truth from the wordy chaff in which it is too often enveloped. We are here, by our discussions, to elicit the truth from the conflicting statements of what is truth. We are here to meet each other socially; to remove in that way all prejudices, to promote kindly feeling, to renew old friendships, and to lay the foundations of new friendships, and, by personal intercommunion to knit more closely the bonds of that professional brotherhood of which we are so justly proud."

A vote of thanks having been given to the President for his address, Dr. Waite exhibited his specimens of PRE-HISTORIC DENTISTRY.

Dr. Waite said the specimens he had to show them were interesting on account of their undoubted antiquity. Those who read the *Independent Practitioner* would have seen in the January number an article by Dr. Van Marter, of Rome, in which he described two specimens of artificial teeth which he had found in the Museum of Corneto-Tarquinius near Civita Vecchia and of which by permission of the authorities he had some carefully executed drawings made, which were reproduced in the above-named periodical. Soon after this paper appeared, he (Dr. Waite) received a letter from the editor of the *Independent Practitioner*, stating that he had heard from a friend in Philadelphia that there were some specimens of a similar kind in the Museum at Liverpool. Dr. Waite then communicated with the Curator of the Brown Museum, and found that there were some specimens of the kind there, and he wrote a short description of them, which appeared in the April number of the *Independent Practitioner*. When he decided to pay a visit this year to the United States, he thought it would be interesting if he could get the specimens for exhibition, and after some trouble he did obtain the loan of them, and had shown them before two of the

New York Dental Societies, and he now brought them to Hereford that the members of the Western Branch might also have an opportunity of seeing them. The Curator of the Brown Museum informed him that these specimens had originally belonged to the Mayer collection, and attached to them was a paper in Mr. Mayer's handwriting, stating that he had obtained them in 1857, and that they were supposed to have been found in an Etruscan grave. Mr. Mayer was a jeweller of Liverpool, who had devoted all his leisure to the formation of a valuable collection of antiquities. Those who had any antiquarian knowledge would know that no written records existed of the period to which these specimens belonged. All that was known of these people was derived from the relics which had been found at various times. The specimens showed that even at that early period (about 600 B.C.) they had a very good idea of restoring the loss of teeth, and that they adopted a plan similar in general outline to that now practised. He would add that as it was the custom amongst these people to cremate their dead, only princes and nobles being embalmed and buried, it would be very difficult to obtain any number of specimens such as he then exhibited, even though the practice might have been a common one.

The President, after thanking Dr. Waite for the trouble he had taken, remarked that they showed that absorption of the alveolar processes was not a new disease, otherwise the frame now shown could not have been worn.

Mr. Hunt observed that the date assigned to these specimens would make them about contemporary with Hippocrates, but there was no mention of anything of the kind in his works.

Mr. Spence Bate then read a paper on "EXCISION *v.* EXTRACTION OF STUMPS." (As this paper was also read at the Annual Meeting of the Association, it has been printed in the report of that meeting, to be found at a subsequent page.)

The President having invited discussion,

Mr. Balkwill said he had found in his own practice that the plan Mr. Bate had recommended was specially important in regard to the lower front teeth. These should always be retained as long as possible. He had met with several cases in which the extraction of these teeth before middle life had made the fitting of false teeth almost impossible, on account of the amount of absorption of the alveolar process which had taken place.

Mr. Hunt said his experience was that roots treated in the manner described by Mr. Bate acted as a most serviceable buttress or foundation for a plate to rest upon; that, as a rule, the alveolar process remained full and of normal size; and that patients could bite as hard again on such a foundation as they could on the ordinary gum unsupported by such roots. It was astonishing how many years roots, if carefully treated in the first instance, would remain, to the great benefit of the patient's power of mastication. He fully endorsed what Mr. Bate had said on this subject. He thought this was a department of conservative dental surgery which deserved more attention than it generally appeared to receive.

Mr. Cooke Parson said he quite agreed with the views expressed in the paper. He should be glad to know whether Mr. Bate was in the habit of capping the whole surface of the root, or whether he merely filled the canals and left the rest exposed.

Mr. H. Mallet said he thought there could scarcely be two opinions as to the benefits to be derived from following the course adopted by Mr. Bate. It was really distressing to see the patients who sometimes consulted him on account of the trouble and disfigurement they suffered owing to wholesale extraction of teeth and consequent absorption of the alveolar processes. He found Jacob's gutta percha a very useful filling in many of the cases referred to by Mr. Bate; he had seen cases in which this had done duty for fourteen or fifteen years, where a plate had been worn over it. Of course gold fittings might be better, but when they knew that in many cases they could not do exactly what was best, for the reason that the patient would not give a *quid pro quo*.

Mr. Bate said that if teeth were to be preserved they should be treated in the best way possible, and the practitioner should carry out the work to the best of his ability, looking upon an immediate return in the way of fees as a secondary matter. No doubt patients would occasionally fancy that the dentist was doing work there was no occasion to do, but if they could bring such people to experience the benefit of proper treatment, and to feel that the work was properly done, they would soon get them to pay a fair sum for the skill and time expended upon it. If a patient would not allow the work to be done it could not be helped, but he thought they ought not to omit doing their duty simply because they did not always get paid for it. His practice was to bevel the edges of the stump, and to have a good layer of gold on the surface. He thought Jacob's gutta percha was a first-class filling for preserving the teeth, and it would occasionally remain in for a long time, but he generally used it only as a temporary filling. When a tooth had been excised, the pulp removed, and the canals filled at once, he had never known abscess to occur.

Mr. Hayman said when artificial teeth were placed over stumps, he noticed that patients often came back with the plate broken.

Mr. Spence Bate replied that his own experience was that plates fitted over stumps did not break oftener than others.

Dr. Fernald said he had tried the plan of retaining stumps, but he had met with a good many failures from the occurrence of periostitis and abscess. He could not help thinking that men were occasionally led to preach at such meetings more than they practised at home. At all events, after listening to the able practitioners who had spoken, he felt bound to confess that he had not been as successful in his attempts to preserve stumps as he could wish to be.

Mr. Spence Bate replied that he had only advocated the retention of healthy stumps, and that if abscess did supervene, it could in many cases be successfully treated.

Dr. Waite said it seemed to him most desirable to save all the teeth and stumps they could before introducing artificial substitutes. But for the most part where they had to supply artificial teeth, the crowns of many of the natural teeth, probably one half of them, had decayed and broken away, and the pulp had been dead for some considerable time. Now he drew a considerable distinction between a tooth, the pulp of which had been destroyed artificially, and one, the pulp of which had died a natural death. He thought this was probably the explanation of the difference of opinion they had just heard. When they destroyed a pulp artificially and removed it within a few days, there was every probability, in a healthy person, of successful treatment and the retention of the root for a long time. But in cases where the pulp had been dead a long time, the chances of successful treatment were greatly diminished, and if abscess did not already exist, it was very likely to follow from the mere preliminary treatment and the slight irritation which was set up by the operations necessary for cleaning out the root. Mr. Spence Bate had said that he only advocated the retention of healthy roots; but if the unhealthy roots were removed and the healthy retained, this gave rise to another difficulty, namely, the inequality of the surface left for the plate to rest upon.

Mr. Spence Bate said they must of course satisfy themselves that an abscess did not already exist, and that the root was not necrosed. If abscess supervened under the circumstances referred to by Dr. Waite, he should be disposed to attribute it to some portion of decomposing pulp left far up in the roots. Of course everyone met with cases of difficuly, and they were obliged to consider how these could best be met, but he thought the general rule should be that which he had stated, viz., to save roots wherever possible.

The Secretary then read the following short communication from Mr. Helyar, of Bristol, on "POWDERED CHARCOAL AS A ROOT FILLING":—

In these days of "save all teeth," with a minimum amount of labour and a maximum amount of success, the value of charcoal as a means to this end is worth attention. It is antiseptic, absorbent, indestructible, easy of introduction, and also, should necessity require, of removal. In cases of putrescent pulp or of fistulous alveolar abscess, the pulp may be removed, the canals cleaned and the charcoal inserted up to and including a portion of the pulp cavity, and on this an oxychloride filling may be inserted at the same sitting, with greater certainty of a satisfactory result than with any other substance at present in use, at least, in my experience.

Mr. Hunt showed and described Coxeter & Nehmer's electromotor burring engine, and made some remarks on other inventions of the same character.

In the afternoon Mr. F. H. Balkwill, of Plymouth, gave a practical demonstration on "Adhesive Gold Fillings, introduced with Smooth-jointed Instruments," and Mr. Browne-Mason gave a demonstration of the Herbst method of filling, and exhibited a number of specimens of gold and tin fillings, which had been sawn in half and submitted to other tests.

In the evening the members dined together at the "Green Dragon" Hotel, Mr. McAdam taking the chair. Amongst the visitors present were the Mayor of Hereford (Mr. J. H. Morley), Drs. Bull and Smith, and Messrs. Turner and Thomason, Physicians and Surgeons respectively to the Hereford Infirmary. Mr. Browne-

Mason proposed "Prosperity to the City of Hereford," and the Mayor responded.

Mr. H. Spence Bate, in proposing "The Medical Profession," said there was no army of men more entitled to their respect than the medical profession. He alluded to the struggles which the members of the profession had had to obtain recognition from the legislature as a body. It was because they helped their brother dentists that the latter respected them; it was because they seconded the latter in every way, and were men who in everything led the van of civilisation and of culture, that he asked them to drink to the toast with enthusiasm.

Dr. Bull, in response, said it was a good thing for the medical profession and the public that the dentists had raised themselves of late years to a position so well marked and so thoroughly recognised. It relieved the medical profession of a very painful part of their duties, one which required mechanical skill, patience and amiability, which, perhaps, the former profession did not possess. Meetings of the kind which had been held that day were profitable, not only for the acquaintances thus made but also for the opportunities of benefiting by the experiences of one another. The mark of true science and skill was not to make secrets, but to impart to others any means of success which it might have been their happiness to attain.

Mr. Turner said he was very happy to be present that night, and if the harmony existent amongst the dental and medical professions continued as well as it seemed to have done that evening, they would be a very happy family indeed.

Mr. R. Rogers, who was received with loud applause, asked the company to drink to the health of the new President, remarking that the name of McAdam had been associated for half a century with the city of Hereford.

In replying, the President deprecated the use of such flattering terms as had been made use of by Mr. Rogers. He acknowledged that he had done his best to bring about a successful meeting, and though he had had to contend with many obstacles, yet he trusted that they were all satisfied with the reception accorded them and the entertainment provided them.

Dr. Bull, in the absence of Mr. R. Thomason, proposed the toast of the evening, "The British Dental Association and its Branches." He considered that such meetings did a great amount of good, by teaching the members to know each other and to approve of each other. He coupled with the toast the name of Mr. Parkinson.

Mr. Parkinson, who was received with applause, referred to the part which he had taken in forming the Odontological Society and the British Dental Association, saying that on this account it was most gratifying to him to see so flourishing an offspring as the Western Counties Branch. He was equally pleased to see the warm reception which they gave to the mention of the Benevolent Fund, and he hoped they would not forget that it formed an important part of the Society's work. If they were in possession of more funds they could do a still greater amount of good than at present.

This concluded the toast list, which had been varied during the evening by a number of glees, songs, duets, &c.

On Tuesday several of the members formed themselves into a party, an excursion being planned by water from Ross to Monmouth. They started at 9.45 from Hereford by train to Ross, and went thence by boat down the Wye, passing Goodrich Court and Castle, Symonds Yat, the "Seven Sisters" Rocks, &c., this district including some of the most beautiful scenery of the Wye. The necessary arrangements were made by Mr. McAdam, and carried out in a manner that left nothing to be desired. The weather was brilliantly fine, and the excursion proved a pleasant finale to what has been a most enjoyable reunion of the members of the Western Counties Branch.

THE ANNUAL GENERAL MEETING OF THE ASSOCIATION.

The Fifth Annual General Meeting of the Association took place at Cambridge, on Thursday, Friday, and Saturday, the 27th, 28th, and 29th of August.

About a hundred and thirty members attended, a number slightly in excess of last year.

Thursday.

The Representative Board met in the Committee room of the Union Society at 9 a.m. Mr. John Tomes, F.R.S., occupied the chair, and nearly all the members of the Board were present.

The minutes of the last meeting having been read and confirmed, Mr. Hutchinson proposed that it be suggested to the General Meeting that the Annual Meeting of 1886 be held one week earlier in August, viz., on the 19th, 20th, and 21st. Mr. Oakley Coles seconded the proposition, which gave rise to a considerable amount of discussion, but was finally agreed to.

Mr. Oakley Coles proposed that "in the opinion of the Board, it is desirable that once in five years the Annual Meeting of the Association be held in London or its neighbourhood." This was seconded by Mr. S. J. Hutchinson, and after much discussion was carried.

It was then proposed by Mr. Oakley Coles, seconded by Mr. Hutchinson, and carried by acclamation, that it be recommended that the next Annual General Meeting be held in London, and that Sir Edwin Saunders be the President-elect.

Mr. J. S. Turner then proposed the re-election of Mr. J. Tomes as President of the Representative Board, pointing out the invaluable assistance given by him to the Association; this was at once carried by acclamation.

A vote of thanks to Mr. Tomes was then proposed by Mr. Turner, seconded by Mr. Parkinson, and carried with applause.

The General Meeting of members for the transaction of business was held in the Debating Hall of the Union Society. The President, Dr. John Smith, LL.D. (President of the Royal College of Surgeons of Edinburgh), took the chair at half-past ten, and called upon the Treasurer for his report.

Mr. James Parkinson said the balance standing to the credit of the Association amounted to £620. He was sorry to have to add to this statement another of a far less satisfactory character, viz., that there were about a hundred and twenty subscriptions for the current year unpaid, and twenty which had not been paid for two years.

The Hon. Secretary, Mr. F. Canton, read the report of the Executive Committee.

Gentlemen,—Your Committee have the pleasure of placing before you their annual report, which shows progress again in every respect.

Soon after the last annual meeting, another Branch was formed, and called the Central Counties, Mr. Chas. Sims being the first President, and your Committee feel that the thanks of the Association are especially due to that gentleman for the exertions he has made to obtain the formation of this Branch, which makes our sixth.

During the year, the Executive have found it necessary to twice prosecute a man named Wm. Robertson, of Edinburgh, for persistently infringing the Dentists' Act ; on September 25th, 1884, he was convicted and fined £5, and on January 9th, 1885, £20, the full penalty being pressed for the second time. On March 6th, Alexander Ross French, of Dundee, was also prosecuted for infringing the Dentists' Act, and was convicted and fined £10. In addition to these prosecutions, three other persons, who were acting contrary to the Dentists' Act, were induced to discontinue doing so without legal proceedings being taken ; some other cases are now under the consideration of the Board.

The number of members reported last year was 536, this year the number is 562, showing an increase of 26 ; but if we take into consideration the fact that no less than 18 were removed at the end of last year for non-payment of their subscriptions, it really shows an increase of new members of about 50, clearly showing that in this respect the Association is in a thoroughly healthy condition. Three members have died during the year, and one has resigned.

At the last Annual Meeting your Committee had to bring before you the name of Mr. H. J. Partridge for formal expulsion from the membership of the Association, since which it was found necessary to bring his advertisements under the notice of the Royal College of Surgeons in Ireland (of which he was a Licentiate in Dental Surgery), with the result that they have seen fit to cancel his diploma and requested him to return the same.

Your Executive would call attention to the good work done by the Branches of the Association, to the excellent meetings they have held, and more especially to the harmonious way in which they have endeavoured to work with the Representative Board.

The Committee has been in communication with the General Medical Council on various subjects, and, among others, have induced the Council to remove the name of Charles Rudolph Werner from the Dentists' Register, he having been convicted of fraud. Communication has also again taken place with the authorities concerning the formation of the Jury Lists.

The Transactions have been issued in a separate volume as before, and the *Journal* continues to improve and become more and more important.

Your Committee feel that the Benevolent Fund does not receive the support that it might, though with the small means at its disposal it has accomplished much: but full particulars of this Fund will be laid before you in due course.

Messrs. Rait and Kearton, the Auditors, have been re-appointed, and Mr. Pink remains our active Secretary.

The names of the retiring members of the Board will be placed before you, and other names suggested for election in their place.

The ordinary proceedings of the Association being so fully recorded in the *Journal*, there is no need to detain you longer with this report, more especially as we have a long programme to work through.

The report was adopted.

The President said the next business was to decide upon the place of meeting for 1886. The matter had been considered by the Representative Board that morning, and they had, after careful deliberation, decided to recommend that the next meeting should take place in London. One of the reasons which had influenced the Board in making this recommendation was that they suggested that the next President of the Association should be Sir Edwin Saunders. He thought it best to introduce the two items of business together as the one hinged on the other.

Dr. W. H. Waite said he had very great pleasure in proposing that the meeting should endorse the recommendation of the Representative Board that the next meeting should be held in London, and he felt sure that all had heard with great pleasure the suggestion that Sir Edwin Saunders should be the next President. He begged to propose that these recommendations be agreed to.

Mr. Spence Bate said he had great pleasure in seconding the motion. Until he heard who was to be the President-elect he felt strongly disposed to oppose the suggested place of meeting; but under the circumstances, he thought they could not do better than follow the course recommended by the Board. At the same time, he thought that as a general rule the Association would do well to keep to the provinces. A young society, as theirs was, was lost in London, and even in such large towns as Manchester, Liverpool and Birmingham; but in smaller towns they would make more show, and would attract more new members, and would more quickly grow into a large society. He had given the reasons why he had at first felt some doubts on the subject, but he hoped the resolution would be carried unanimously.

The President then put the motion, and it was at once carried.

The President said the next business was to decide upon the date of the next meeting. Some discussion on this question also had taken place at the meeting of the Board, a proposal having been brought forward to alter the usual date of the meeting. He would, however, leave it to the proposer and seconder to explain the proposition in detail. That having been done, the resolution that the next Annual General Meeting be held on August 19th, 20th and 21st, 1886, was then put to the meeting by the President and carried.

Mr. James Parkinson, the worthy treasurer, was re-elected.

The President called upon the Hon. Sec. of the Benevolent Fund for his report.

Mr. Oakley Coles said he would only state very briefly that the work of the Fund had been actively carried on during the past year. There had been an increase of forty in the number of subscribers, and some small additional donations had also been received; but the claims upon the Fund had also considerably increased. Full details would be given at the Annual Meeting of subscribers which would be held next morning. He was glad of the opportunity of speaking there, chiefly that the name of the Fund might appear on the minutes of the Association, so that all members might see that it was part of the work of the Association, although up to the present time not a single member had received any benefit from the Fund which it had provided for the needy.

A vote of thanks was given to the President and also to the Hon. Sec.

The President declared the business concluded, and visitors having been admitted, the President (Dr. John Smith, M.D., LL.D., P.R.C.S.Edin.) proceeded to deliver his

VALEDICTORY ADDRESS.

Ladies and Gentlemen,—One of the privileges of the chair in such Associations as that which I have at this time the honour of addressing, is the opportunity afforded its occupant, at the close and the commencement of his official career, of offering a few words to those who have paid him the compliment of placing him in that esteemed and dignified position. Of this privilege I have now to avail myself, and on relinquishing the Presidential capacity to which you so kindly elevated me a year ago, and which for the last twelve months I have been most proud to occupy, I would submit for your acceptance a very few valedictory, and I fear I must say, somewhat discursive observations.

The Association represented here to-day partakes, I need scarcely say, to a greater extent of an administrative and governmental than it does of a disquisitionary or scientific nature. But while its executive element, in promoting and consolidating the interests of the dental body corporate, may be considered as the major function of the Association, the communications, the illustrations, and the demonstrations presented to the members attending this meeting afford abundant evidence of the aid, encouragement and impetus it also gives to dental science, to the interchange of information and opinion, and to the promotion of social intercourse among those belonging to the numerous body of dental practitioners upon its roll.

During my term of office, the Branch Meetings of this large and influential society have exemplified the extent and value of its operations—the absolute necessity for its existence, and the excellent and important results it is calculated and has been able to effect. To the advances of scientific work accomplished under its fostering care I shall not now advert. The reports of its Branch Meetings testify to the important steps, or shall I rather call them giant strides, made within the short span of a single year in this direction, and in the elevation of Dental Surgery as a branch of Medicine. And I may here interpolate, in a parenthetic form, that apathetic, dilatory, or over-cautious as some have been inclined to consider the bearing of the General Medical Council—so far as it goes in regard to certain aspects of dental business—the scrutinizing interest, the mature deliberation and the careful attention of that, the highest medical tribunal in the land, manifest that its actions are scrupulously weighed and impartially dealt out; while at its meetings Dental Surgery is rapidly being recognised on equal terms, and assigned a place upon the self-same platform as that accorded any other one of the higher departments of the healing art.

Turning, then, from the scientific to the administrative business coming before the Association during the past year, the list of prosecutions which it has entered upon forms, no doubt, the prominent and most noteworthy feature for consideration. Of these, and of the other incidents occurring then from time to time, let me here but briefly recapitulate a few.

Shortly before I ascended your Presidential chair, an alleged attempted case of personation—that is, one individual fraudulently implying to the public that he was another practitioner—had occurred, and was one of those cases in which the General Medical Council was, at its meeting on October 11th of last year, held by some to have been rather lukewarm at interfering. At the meeting of your Representative Board, on November 1st of the same year, the successful—if it can be altogether so denominated—case of Robertson was communicated by Mr. Bowman McLeod, whose disinterested labours in the matter are everywhere well known and appreciated. Some time previously to this the case of Holford had devolved upon our Secretary, Mr. Canton, for its prosecution, and was one of those examples testifying to the care and circumspection demanded in the discharge of such troublesome, responsible, and most obnoxious duties. On the 9th of the same month we find Robertson again successfully prosecuted, although again without material result, and on this occasion by the Secretary of the Association. On the 6th of March of the following year, 1885, the prosecution of French, of St. Andrews, described as an ex-confectioner of Dundee, was carried out at Cupar, for unwarrantably assuming the titles of Dental Surgeon, D.S., D.D.S., the prefix of Dr., &c., and practising as such designations imply the right to do. In April, another, and this time a fruitless prosecution—Hodgson *v.* Yates, for assuming the affix of R.D.S., described as meaning "Registered Dental Surgeon,"—was dismissed with costs against the pursuer, the accused being found to have been at one time a registered practitioner. In addition to these, the more salient of the legal memorabilia of the current year, there took place at Nottingham, on April 17th, the meeting and dinner of the Midland Branch of the Association, where I had the honour of attending, and at which meeting much interesting and important matter bearing on such cases as have just been noticed came to be discussed. At this time also, while passing through London, I took the opportunity of directing the attention of some members of the Government to the possible effect which the passing of the "Poisons Bill," in its then existing form, might exercise upon the powers and privileges of the dental profession. Lastly, on

June 5th, another great and most successful gathering took place at Dundee, upon the occasion of the Scottish Branch holding its third annual meeting there, and where I had the privilege of delivering my valedictory address upon retiring from the Presidentship of that important section of the Association. Since that time no event of any greatly interesting or exciting nature has transpired, and it is to be hoped that the firm and definite attitude assumed by the Association in the legal actions of the year may have had a wholesome and deterrent effect, and that those that are now past may constitute the majority of such prosecutions which the Association may ever, during its existence, be called upon to undertake.

Much, however, as we may congratulate ourselves upon the success of such proceedings, they have cost no little trouble and annoyance, and have shewn the care and delicacy involved in successfully carrying out all matters of the kind.

To the more impetuous, exacting and impulsive spirits amongst us, they are well calculated to exhibit that the glare and radiance of a new beacon fire just lighted for our guidance, such as the Dentists' Act, must not be allowed to blind us to the fact that enthusiasm for progress cannot be permitted to exercise a rough-shod contempt for, or to ignore, the calm but stern and impartial demand of facts and circumstances as they exist, not in one but in all their aspects, whether in the interests of the prosecution or the defence; and that much as reform may be needed and desired, it must, here as elsewhere, be always sought for by paths where the way towards our ends is paved with judgment, leisure and discretion.

Taking a comprehensive view of the mass of offenders against the Dentists' Act, they seem to be divisable into two separate and materially different classes—first, those who are registered and, may be, specially qualified practitioners, but who conduct themselves in a manner unworthy of their position; and second, those who are not registered, but who engage in practice as if they were duly registered practitioners. And it is in dealing with the latter class—those whose offence consists merely in carrying on practice without any right to that registration which alone entitles them to do so—that, perhaps, the greatest difficulty is experienced. In these cases, no range or grade of penalties exists. In the other class, that of registered practitioners guilty of professional indecorums, the punishment, I presume, as in the case of medical practitioners, shades off from suspension or withdrawal of a diploma or erasure from the Register down to a mere remonstrance or admonition. In the other, it is the summary and total ablation and extinction of the culprit which is, in all cases, sought, and is the award. This constitutes a difficulty which, though serious, has occasionally almost a touch of humour in it, since, even after such supposed extermination, the offender may, like the phœnix of old, be found rising from his ashes—possibly in a new, but most likely in a form and shape as defiant and offensive as ever. Prosecution after prosecution may here be advocated and persisted in, but in such miserable cases as these generally are, there exists the danger of this procedure being construed into one of persecution, the risk of such misconstruction being increased by the fact that the part of Public Prosecutor has to be undertaken by a private individual and a brother in trade. In such cases the ignorance of the real question at issue, and the interest, notwithstanding, taken in them by that great judicial body and court of law—the general public—plays even a more important and decisive part, and one of greater weight in certain ways than the statements or opinions of the members of that profession more immediately concerned. For we must recollect that in such cases the public is ever inclined to "gently scan our brother man," and, moreover, is ever inclined also to stamp it as beneath the dignity of the learned professions to descend to fight what it is pleased to term those petty indiscretions which are alleged to brand the perpetrator in the public eye much deeper, much sooner, and much more effectually, when he is let alone. And there is no doubt that such a feeling being known to be abroad is, to a greater or less extent, a consideration which acts as an embarrassment and a restraint, in a certain measure, upon the normal course of justice.

I am not here, however, upholding a policy of non-interference with offenders—I am not dissuading from legal measures or proceedings being instituted against law-breakers. Far from it ; I merely question whether the game is worth powder and shot. I am attempting to inculcate that perhaps in certain instances some of these cases, although irritating, are of so insignificant and contemptible a character as to render it questionable whether it might not be more expedient, more dignified, and more efficacious, that they should be set at nought. In dealing with the other class of offences, especially with those of a more flagrant character, little hesitation need be felt. Foremost amongst these, the assumption of false or spurious titles, of pretended qualifications, of misleading and fictitious subterfuges of any kind, constitute the individual simply as an impostor who, under covert and convenient seeming, is as dangerous to the general community as his conduct is nefarious towards the duly-constituted practitioners alongside of him. Of infamous conduct in a professional point of view, this is, perhaps, the worst and most momentous form, and one to which no consideration or lenience need be shewn. Apart from such more flagrant cases, however, there are gradations of disreputable or unprofessional conduct more difficult to dispose of. There are questions of unprofessional conduct between the shades of which no exact or definite line has as yet been drawn. To do so is very difficult. Take the case of advertisements. Now, you are aware that the committal of any offence which amounts to a misdemeanour, or any conduct of an infamous nature in a professional point of view—certainly a somewhat vague definition—may, according to the 13th section of the Dentists' Act, be followed by erasure from the Register; that same erasure from the Register again entailing, peremptorily and *ipso facto*, the withdrawal of the diploma by the authority from whom it may have been granted many years before, and perhaps obtained, not only creditably, but with honours and distinction. This enactment, however, seems to be about all that has been provided for such cases, and the severe and serious nature of such a sentence renders its infliction painful and repulsive, and therefore, except in extreme circumstances, explains its being always difficult to obtain, either at the hands of the Medical Council or of the Licensing Boards. Such a system of punishment, in fact, has of late been brought under notice as a supremely interesting subject of study, and one not in every case at all likely to be unanimously approved of. Punishments of this kind, indeed, where a second penalty is entailed solely in virtue of, and altogether consequent upon, the mere fact of a previous one having been inflicted, are, in the sense of a recent article by the Hon. Justice Stephens—appearing, I think, in the *Nineteenth Century Review*—always undesirable and hampering to the judge, and generally distasteful, as operating with retrospective severity, and tending to punish literally for having deserved well in earlier life.

Let me, however, not wander into abstract or tedious speculations. If I have expatiated upon a subject likely to be a moot and debatable point, it is because it forms the key-note and leading matter of my text, as found in the *resumé* given of the Association's work last year, while it is at the same time a subject demanding dispassionate consideration and a full insight into the difficulties with which it is beset. And I merely go thus far towards keeping in mind that whether or not such difficulties are unremovable or insurmountable, still they exist and are to be taken into account. Great differences of opinion on such questions necessarily exist in all such large bodies as the British Dental Association; various estimates are certain to be held of the magnitude and importance of different forms of offending, and various ideas entertained as to the severity and summary and off-hand nature of the punishment which ought to be inflicted. It is as well, however, that our action in such cases should be as little as possible of a vindictive, or high-handed, or headlong tendency, but rather with the disinterested aim and object, as Sir John Lubbock well put it in one of the earlier debates upon the Dentists' Bill, of protecting the public against quacks and quackery, by giving it a complete and easily accessible opportunity of ascertaining for itself whether or not any one assuming to be a trustworthy member of the dental profession is properly qualified; and this, there is no doubt, is already largely supplied in the publication of the Dental Register. And the duty of the dental profession, more especially as it is represented in the British Dental Association, is to assist in maintaining that Register in as pure and reliable a state as possible.

Nor, after all, must we expect too much; for do what we may, and with all forbearance doing our very best in such a cause, either as individuals or as an Association, I fear we shall find, in the words of a writer whose works are familiar to you all, that,

——" In the world, as in the school,
We see how fate may change and shift,
Success be sometimes with the fool,
The race not always with the swift;
The strong may yield, the good may fall,
The great man be a vulgar clown,
The knave be lifted over all,
The kind cast pitilessly down."

I shall not detain you much longer with any remarks I have to make. There is only one other matter to which I would allude very briefly, and it is in another direction altogether from the discussion of offences and penalties. It is in reference to the expediency of visitation of the dental examinations in the same manner, or something similar, to what is carried out at the medical examinations. I would even suggest the expediency of an interchange of delegates from the different Licensing Boards at the various dental examinations, as is now customary at the medical and surgical ones of the Scotch examining bodies. In this manner a uniformity in the examinations—at least on the general subjects—might be more certainly secured. The special subjects might, I think, be safely left to the special circumstances of these examinations, and to the care of the special examiners, chosen as they usually are from the various dental schools. A recommendation to such effect might, if approved of, be forwarded from the Association to the different Licensing Bodies, so that they in their turn might communicate with the General Medical Council on the matter. Visitors, I am aware, may at present be selected by that body from time to time for both the Medical and Dental examinations, but I do not know that those of the Dental Boards have ever as yet been honoured by their presence. I do not for a moment suppose that any of the Dental Examining Boards require such supervision, or have any cause to fear it. But it might be of some service as a guarantee to the outside world that these examinations were all up to the mark, and were conducted in a fair, a uniform, and an efficient manner.

And now I have ended. One trying, although essential element in a valedictory address, is its suggestiveness of a formal separation and a last farewell. Its terms recall the memory of days and work and incidents gone by, and are tinged with the sad and sombre colouring of a last look and a parting benediction. Were it possible to infuse into it something of a more genial, auspicious and cheerful character—something more nearly approaching the nature and the spirit of a triumphant general's return and report of himself after an arduous and successful campaign—I should feel in a happier frame of mind than I do at the present time. Unfortunately, this is incompatible with the nature of things, and cannot be. The occasion must be to me the close and not the advent of a day of honour and high place. That closing day however, has yet been to me a very pleasant one; one, too, which has not been wanting in propitious and eventful episodes, in stirring and momentous records, a day whose dawn in the far north has only given a fair promise of its glowing sundown in the south. Its morning mists rose amid the gray gables of Edinburgh, and its evening shadows fall most befittingly in the classic realms of Cambridge. What more need I say? unless indeed I extend the metaphor to my worthy successor in the chair and add:—

"That sun hath made a golden set,
And by the bright track of his fiery car
Gives token of a goodly day to-morrow."

Mr. John Tomes, F.R.S., said: In proposing a special vote of thanks to our retiring President, Dr. Smith, you will thank him, I know, for having been our President, for in doing so he has conferred honour and distinction on the Society over which he has presided. For we know, and the world at large may know—at all events such portion of the world as is interested in our subject—that he is a gentleman, and an accomplished scholar, a man worthy of leading us, whose example may be followed in all matters relating to professional conduct—a very serious question indeed that same question of professional conduct—and we shall all do well to study what Dr. Smith's professional conduct has been, for we may follow it with the certainty that we are doing right and ennobling ourselves in so doing. I will not detain you longer, as time is passing on, but I will ask you to give a hearty vote of thanks and wish long life and happiness to Dr. Smith, who has to-day made his adieu as President, but who, I hope, we shall long see among us.

Sir Edwin Saunders said: It affords me very great pleasure to second the vote of thanks which Mr. Tomes has so happily worded. It is always an advantage to an Association like this to have a man of recognised ability and of recognised honour at its head, and that that man should have attained, as Dr. Smith has done, to distinctions which are not commonly shared by the department with which we are associated. All who had the good fortune to attend the meeting in Edinburgh last year must have retained very pleasant memories of that occasion, of the cordial welcome, of the noble reception, of the distinguished position which the profession was enabled to hold; how everything worth seeing in that beautiful city was thrown open to us, not as it would have been to any of us individually, but as an Association; and therefore I look upon that meeting of our Association in Edinburgh as being the most important meeting by far that we have yet had, and as marking an era in the history of our Association. We were led to expect from the admirable, interesting, scholarly, and instructive address that our President gave us on his installation, that he would give a high tone to the Association throughout his year of office, and that he would deliver himself of some sound advice in his valedictory address, and in this, I am sure, we have not been disappointed. I heartily second the vote of thanks which has been proposed by Mr. Tomes.

The vote of thanks was accorded with great applause.

The President: I have to thank you most cordially for the kind manner in which the speakers have expressed themselves with regard to myself, and assure you I have had a great deal of pleasure in occupying the chair, which I now vacate in favour of my friend the President-elect.

The President-elect, Mr. Richard White, L.D.S.Eng., then took the Chair, and delivered his

INAUGURAL ADDRESS.

Gentlemen,—As President of the British Dental Association for the ensuing year, I ought, perhaps, to have but one feeling, that of pride that you should have deemed me worthy of so great an honour; but when I reflect upon the talent of my distinguished predecessors, men eminently qualified for so exalted a position, I am compelled to claim your indulgence for any errors I may commit, and to express a hope that you will classify them as errors of the head and not of the heart.

At the Inaugural Meeting of the Eastern Counties Association, in the address from the chair, I essayed an historical sketch of the advance of the Dental profession during the past fifty years, and as the origin, aim, and consolidation of the British Dental Association have been fully expatiated upon by the past occupants of this chair, it behoves me on this occasion to offer a few remarks on the prospective possibilities, rather than the retrospective actualities of our profession.

The prospect may be divided into educational, social, political, and scientific. In no place could the educational question be more thoroughly and impartially ventilated than in this centre of classic learning, which has in recent years shown how much may be effected by liberal reforms to meet the requirements of the age. The authorities of the University of Cambridge may justly feel proud of their medical school, which, although of comparatively recent date in its present extended form, annually increases in prosperity and usefulness, and takes a leading part in all questions relating to medical education.

Gentlemen, we live in an age of progress; to be stationary is to degenerate, and as with individuals so with institutions, they become effete or fossilised, if I may so term it, unless remodelled according to the times.

Who thirty years since would have imagined it possible that in 1885 a Dental Association, on the basis of the British Medical Association, would hold its annual meeting in this important town? That the University would give its members such a hearty reception, would throw open its colleges and grounds for their entertainment, and offer the use of its public buildings for the Association meetings? Our warmest thanks are due to the authorities for this expression of their kindness, whereby our visit is made so enjoyable, and the complete success of our annual gathering ensured.

Although at present there are but few of our members who can rejoice in calling this university their *alma mater*, rest assured the day is not far distant when many dentists *in statu pupilari* will enter at the great medical school established here, and if a dental school similar to those at Edinburgh, Glasgow, Manchester, and Dublin were formed in connection with the University, would it not be both an educational and financial success? There is much in favour of such a scheme. The general and professional education of the dental practitioner ought not to be inferior to that of his, at present, more favoured medical *confrere*. The Medical Council being of this opinion with regard to general education, requires the same preliminary examination in arts in both cases before students are permitted to register and commence their professional course of study.

Now the University of Cambridge offers great advantages for the study of the collateral sciences. As I have stated, it already has attracted to itself a large medical school, and should it establish a degree or license in Dental Medicine and Surgery, its numbers would doubtless be considerably increased by the aspirants for honours in these subjects. The University laboratories for the prosecution and study of general science are admirably arranged, and there would be no difficulty in forming one for practical education in dental mechanics, upon the same footing as that which is said to be so full of promise at Dublin.

Our social progress will be commensurate with our educational advancement, of which indeed it must be the natural outcome, for mental culture brings social qualifications of the highest order, and these qualifications are fully recognised by the existing code of civilisation. In the future, men who are ambitious of taking the best social position the dental profession affords, will enter at one of the universities, as students of medicine are doing at the present day; for a university career to a professional man offers immense advantages in after life. A status is gained, friendships are formed, and a healthy and beneficial tone is given to the character by the associations of the place (provided the connections formed be happy and judicious), which, as years roll on, nothing appears to obliterate.

While reviewing the social prospect, I would draw attention to the difficulties which confront the recently qualified dental practitioner, who is desirous of establishing himself on a proper basis. If unable to purchase an introduction to a practice, he commences life under greater disadvantages than he would in any other profession. A surgeon has various resident and honorary appointments open to him, which materially assist him as stepping stones to practice, but a dentist, unfortunately, under present circumstances, has nothing of the kind whereby to obtain an introduction, but has as competitors a host of unscrupulous advertisers, who, by unprofessional means, attract the class he, as a rule, might expect to obtain his early patients from. It is easy to imagine the feelings of a young dental surgeon, who has been industrious in the pursuit of professioual knowledge, and has passed the necessary examination for the dental license, when he sees patients consulting advertising charlatans, whilst he for days together is waiting for those who do not come, and brooding over his position, feeling he cannot resort to those measures to make himself known which these unqualified persons revel in, and by means of which in many instances they accumulate considerable wealth. What is the remedy for this unfortunate state of things? Surely the time has arrived for the more general establishment of provincial dental hospitals, each with an adequate staff of duly qualified officers, or at least, for the more general development of the branch of dental surgery in connection with our local hospitals and other charities. The appointments thus thrown open to competitors would be an inestimable boon to the dental surgeon at the outset of his career, and would go far, by educating the public in the value of qualifications, to keep in check the chicanery and demoralising influences which have been so degrading to our profession in the past.

And again, the local branches of our Association, if properly developed, should be of great assistance to our younger members, in bringing about their introduction in the various localities in which they reside. Our parent Association will largely assist in our social elevation, by discountenancing all that tends to detract from our professional status, by enforcing a generally approved code of ethics, and by affording increased facilities for the interchange of ideas at its annual gatherings.

The social problem merges into the political, and the political prospect is favorable in direct proportion to the successful management and enlargement of this Association, whose primary aim is the faithful fulfilment of the various provisions of the Dentists' Act of 1878. Time will eliminate all that is objectionable in the Act itself. It is for us to ensure the maintenance of its good clauses even at the sacrifice of our personal interests. We must regret the legislature did not appoint a public prosecutor to carry the cases of illegal practice into court, instead of requiring a private practitioner or an officer of the Association to become the prosecutor, thus placing the practitioner in a very invidious and painful position. The members of the Association are under great obligations to those who boldly, and at the risk of much professional annoyance, have undertaken such a disagreeable duty.

Doubtless this disadvantage in carrying out the Act will be remedied in the future by obtaining a further legislative measure to amend the defects rendered evident by practical experience.

The enlargement of the Association and the material increase of its influence will greatly depend upon the success of its local branches. Our best efforts should be employed in extending its sway in this direction, by securing new members and increasing its intellectual advantages. The Branch Meetings should take place more frequently than heretofore, and in this respect we cannot do better than imitate the British Medical Association, whose local meetings are held at least quarterly, and whose branches are moreover associated with the medical societies which meet more frequently. The value of meetings for the discussion of subjects of professional interest and the reporting of cases of scientific and practical importance cannot be over-estimated. We must ever regret that so much has been lost in the past owing to the non-existence of local societies for the discussion of these topics.

Our annual gatherings will also continue to be productive of much good, by bringing together practitioners with different views upon various subjects requiring ventilation, and by affording opportunities for learning how little we know when our opinions are pitted against those of fellow-workers in similar methods of research. The positive and contracted ideas of individual members will thereby be enlarged and expanded by more enlightened views, the outcome of careful investigations.

If we examine the Dentists' Register, we observe that although some thousands of names are entered therein of persons who are not eligible for the membership of this Association, yet a great number who are not associated with us might join our ranks, and it is greatly to be regretted they do not see the advantage such a course would be to the profession. Union is strength, and if all eligible would offer themselves for election, the power and usefulness of this Association would be, indeed, greatly increased.

Many obstacles apparently have occurred to retard this expansion, but the day will arrive when those who now from various motives stand aloof will see the great advantages to be derived from grasping the hand of fellowship held out to them.

Doubtless there are some members of the profession who at present remain unconnected with the Association because they consider the standard of membership is too low, and they ask themselves what *they* shall gain by seeking membership; not for one moment giving thought to the sacrifices made by so *many of our leading practitioners* in connecting themselves with it from its earliest formation, and the arduous duties they have undertaken to ensure its successful development.

To some the pleasure of assisting in the task of elevating the position of the dentist is not appreciated or understood.

Surely the advantages accruing to every practitioner, when his calling has been dragged out of the position it has occupied from its surroundings, ought to have some little weight with these; but I am afraid on this subject a considerable amount of apathy prevails. May I not say, of one thing we may rest assured, all desirous of securing and maintaining good social status and enduring professional success in the future must become members of our body—to hold aloof will be to court failure.

It is a pleasing feature of the times, that in this great dental movement of the last few years, the medical profession have recognised the dental profession as nearly allied to their own, and its qualified members as fellow labourers in the great work of relieving human suffering. For how frequently are the dental organs in a diseased condition the cause of much constitutional disturbance, which may be readily combated by a conjoint assistance in the case. And further, this interest in the progress of dental surgery has of late been shown by the papers read by eminent specialists and others at the meetings of the Odontological Society, by the interest taken by specialists in the papers read by dentists, and by the able manner in which they have joined in the discussions that occurred at the various meetings of that society.

We now come to the scientific forecast. The advancement of dentistry will depend largely on scientific investigation, by which I mean investigation executed on the basis of certain defined laws. The prospect is chiefly that of dental pathology and prophylactic dentistry or dental hygiene.

The histological anatomy of the teeth and their environment has been so thoroughly sifted in the recent past by the aid of the microscope, that Nature can have but few secrets to reveal in this direction. The physiology of the dental tissues has been established on a more or less satisfactory basis, leaving but a limited field of enquiry for future observers, but dental pathology is as yet in its infancy, and offers a magnificent prospect for original research. Many and varied are the theories regarding the etiology of caries, greater or less weight being given to the so-called external causes—mechanical, chemical and parasitic, including the action of the food, the buccal secretions and air—while hardly sufficient attention has been bestowed on those more subtle internal agencies, developmental, nervous, vascular and trophic. Moreover, we have heretofore intermingled predisposing and exciting causes. These must be isolated and duly classified before a satisfactory scientific basis can be established. How far parasitic germs can be the *materies morbi* it is not for me to determine, but analogy suggests the probability of their being concomitant with the disease, rather than the true exciting cause of decay. The air is ever impregnated with bacterial germs, and their nourishment being derived from the products of decomposition the seats of decay offer a suitable *nidus* for their proliferation.

In the impaired nervous force, the altered qualitative and quantitative blood supply, and other trophic diminutions, we have what seem to be the true predisposing causes of caries. The exact point of origin of the disease may be purely accidental, arising from the agency of any one or more of the so-called external causes, the importance of which must be therefore largely discounted. The elucidation of this complicated subject might be accelerated by experimental research, by ascertaining the results of traction, section and electrical irritation of the inferior dental nerve in animals, experimental alteration of the quantity of blood supplied to the teeth and, when possible, the quality of the same. But perhaps I am anticipating events too rapidly, so let me turn to a more general subject.

No matter connected with our profession is just now attracting more attention than the general deterioration in the structure of the human teeth of the present day. The older members of the profession especially are daily reminded of an alteration in the character of the teeth they are called to operate upon, compared with those of former years—for then usually they found a density of structure which augured well for successful operations, and the results of those operations were most satisfactory—but the teeth of the present period will seldom permit us to promise anything so favourable, from the acknowledged fact that the tissue upon which we have to operate is so defective in the combination of its constituents, although the operative skill employed has of late years immensely improved. To what is this change of structure to be attributed? This opens up a vast field for investigation.

The deterioration in the structure of the teeth which we observe is not confined to one particular class of people in the civilised world. The highly-fed and the poorly-nourished appear to suffer alike. Nor does country or climate apparently exercise much influence upon the animal economy. English, French, Germans and Americans all seem on the decline as regards the durability of these organs. The last named, probably, more than any of the other nations, which, from an ordinary view of things, would be considered anomalous—for when we have an admixture of fresh blood, we naturally expect to find a more healthy condition of the progeny—for such physiological characteristics apply to animal nature in every form.

We have reason to believe that man in a state of nature, free from the strain of mental pressure, and unattacked by the vices that accompany civilisation, escapes this morbid condition of the teeth. In the mouths of the wild denizens of the back woods or the dwellers upon lands untouched by civilisation at the present day, or in the exhumed skulls of the inhabitants of this isle in the long distant past, we find well-developed maxillæ, and a bold regular arrangement of thirty-two dense teeth, generally quite free from the ravages of caries ; but at the present day we meet with maxillæ extremely contracted and not admitting of the perfect arrangement of the thirty-two teeth when they are erupted. Then deficiencies in the number of teeth are often noticeable, for in many cases one or both the upper lateral incisors are absent, and one or more of the upper canines, if found in the jaw, fail to make their appearance through the gum. The wisdom teeth, moreover, are very frequently absent.

This deterioration of the teeth resulting from a departure from the laws of nature, has probably existed among civilised nations for thousands of years; for it is said that the inhabitants of the ancient empires of the world paid the same penalty from a like cause, if not to the same extent as we are now doing. That caries exists in almost every mouth at the present day, and that its victims during the last few years have increased to an alarming extent, we do not doubt, for of that we have daily proofs.

A question naturally arises—what physiological cause has brought about this change of structure ? For it appears to be the only portion of the human frame that has exhibited this marked deterioration.

It is not my intention on the present occasion to discuss at length this difficult subject, but to suggest points for investigation that I imagine will amply repay those who have at their disposal the time requisite for such an undertaking.

Those who have had the opportunity of examining many cases of the teeth of persons from four generations of patients (which has fallen to my lot), will, I believe, acknowledge that the teeth in each succeeding generation, as a rule, have become more and more degenerated as regards their structure, and are more prone to be affected by caries, that the teeth of females have deteriorated much more than those of the male sex, and further, that through the female line this deterioration is much more marked than through the male line, for a mother with very defective teeth will invariably have children whose teeth partake of the same character.

Acknowledging this deterioration, may not an attempt be made to discover its cause ?

That the mind of the mother exercises an immense influence over the constitution of the child when in its fœtal state no one can doubt, and is it not possible that in these days of constant excitement and of general unrest among all classes, that its baneful effects may have an influence upon the rudimentary dental organs of the child at this early stage ? And may not also in these days, the high mental pressure permitted, and the artificial life of early childhood continuing in rebellion against nature's laws, carry on the degenerative process that had been so early commenced ?

The result of an immoral life handed down from generation to generation tells with fearful effect upon the children of such parents, and the medical treatment in former times to combat the resultant disease, if not at the present day, has had its influence upon the formation of the teeth.

The diet of children during their early years, and until the teeth are fully formed, has been considered of great importance, although in some cases where this matter has been most strictly adhered to, the result has not always, I fear, proved satisfactory. It appears to me, that much cannot be accomplished in this important subject until we are in possession of statistics for our guidance, for without such assistance we are but groping in the dark.

Would it not be possible to ascertain certain facts from our patients which might be tabulated, from which data might be obtained that might guide us, as well as our medical friends, in advising such measures as might, to a certain extent, combat the result of agencies that are at work in producing these deteriorated teeth ?

Collective investigation in the hands of the British Medical Association has already largely assisted in unravelling the history of several obscure diseases, and if persevered in, will aid in furthering the rational treatment of disease as opposed to the empirical drugging of the past.

Collective investigation would eminently assist *us* in ascertaining the causes of this general deterioration in the structure of the dental tissues. We might enquire regarding, and record—

(1) The age of patient.
(2) The general health.
(3) The number and general nature of the teeth.
(4) Number diseased.
(5) General health of parents and nature of their teeth.
(6) If consanguinity existed.
(7) Habits and diet of mother at time of birth.
(8) Habits and diet of child in infancy and during juvenescence.

We thus arrive at the subject of prophylactic or preventive dentistry, or, as it may be termed, dental hygiene, that highest scientific branch of our profession in the future, which can alone be established as the outcome of the elucidation of the causes of disease, and will tend to place us higher in the estimation of the general public than the perfecting of any other branch of our art; for they will recognise in the advocacy of its principles that splendid abnegation of self which can have but one aim—the maintenance of the health of the community. We shall then work on the same lines as our medical brethren, who seek to prevent disease as much as to combat it when already existing.

Gentlemen, I feel I have already trespassed too much upon your time and patience, yet I cannot resume my seat until I have asked you to permit me to introduce a subject that deeply interests many who are present with us to-day, and who have worked so indefatigably to further the progress of an undertaking they have so much at heart. I allude to the Dental Benevolent Fund which is connected with this Association.

The annual meetings of this Association, in addition to their political and scientific character, include a certain amount of pleasure in its social and convivial form, and when entering into and enjoying these pleasures, may we not be reminded that in every profession and calling in life there are those whom adversity in some form or other may overtake, and that they need the sympathy and help of those who escape its heavy hand.

In the dental profession there are so many causes brought into operation that tend to incapacitate the bread-winner of the family from supporting those who require his labour and exertions. All engaged in its duties are well aware that it is a most trying profession, and none but the strong can long stand with impunity the strain it too often proves upon the constitution. The eyes, as well as the brain, may unfortunately show the results of work upon a frame ill-adapted for it, and various diseases may be set up placing the practitioner *hors de combat*.

One of the rules of the Association states, " The object of the Benevolent Fund is to afford privately pecuniary relief when practicable to such necessitous persons as are or have been Dentists, and who have, or have not been, members of the British Dental Association or contributed to the Benevolent Fund, but who in the opinion of the Committee of Management may be deserving objects of relief, and to the Widows and Orphans of Dentists who were or were not Members of the British Dental Association or contributors to the Fund at the time of their decease."

Surely this is an object claiming our warmest sympathy and support. The Committee tell us they need greatly increased assistance to help those applicants deserving of relief, as the means at present at their disposal are totally inadequate to provide for all the cases requiring it.

There are many thousand dentists in Great Britain, nearly six hundred of whom are members of this Association, but I believe the contributors to the Benevolent Fund number about one hundred and seventy.

Before this annual meeting is brought to a close, let us hope the promoters of this Fund will have received promises of increased support, and that a desire will have been shown to assist in establishing it, through the various branches of the Association, upon a more extended basis. And when our duties here are over, and the pleasures connected with this meeting are among the things of the past, may we be enabled to look back upon it with unfeigned satisfaction, for in the midst of our personal enjoyments we did not forget the claims of the incapacitated dentist, the widow, and the orphan.

At the conclusion of the President's Inaugural Address, Dr. Waite again read his paper on "PRE-HISTORIC DENTISTRY," published in the report of the Western Branch Meeting, at page 442.

Mr. C. Spence Bate, F.R.S., read the following paper on "EXCISION *v.* EXTRACTION":—At a time when surgery is conservative in its treatment, and the greatest efforts are being made to retain parts that are only of secondary value, it is remarkable that in dental surgery the instruments available for the forcible removal of a tooth from its natural position have of late years so largely increased.

That many of these are intended to expedite the operation and lessen the pain, is without doubt true, but it also surely evidences a foregone conclusion, that an operation being convenient, is more likely to be determined upon.

It is now some fifty years since a Mr. Fay, of Liverpool, introduced into his practice the mode of excision of the teeth, in order to obviate the pain of extraction, but as his mode of treatment was, after the operation, to allow the roots of the teeth to take care of themselves, it was found that he had to remove a large number of the retained stumps for the purpose of getting rid of abscesses, gum boils, &c.; circumstances that induced him to return to the more common mode of practice, and extract the teeth bodily, rather than allow a portion to remain at the risk of future trouble and a second operation.

I have given this account of Mr. Fay's practice, not from any knowledge of my own, but from what I have heard when I was younger; but it should be taken into consideration that when Mr. Fay experimented on excision, the power of conserving the remaining stumps was not within the bounds of practical surgery, as it has since become.

Long before Mr. Fay attempted the excision of the teeth that are situated in the posterior portion of the jaws, it was carried out and is still continued in relation to the teeth with simple roots, which are largely retained for the purpose of supplying the loss of their crown with an artificial substitute.

If the operation be desirable and capable of being effectively pursued in the anterior portion of the mouth, there is no reason why it cannot be as successfully fulfilled at the posterior, the only reason, as far as I can see, is that our patients generally are in accordance with us in our practice in the former case, but are largely antagonistic in the latter, which coincides with the more convenient and easier mode of preparing the jaws for the reception of substitutes than that which entails a prolonged demand on our time in the necessary treatment that the stumps may require. Another apparently satisfactory reason for the removal of the stumps is the self-satisfying argument that when they are taken out "they are certain not to pain again;" but there are other effects which an extensive series of extractions will produce that, I think, are of greater permanent evil than the risk of local disturbance that may follow the retention of an unsuccessfully treated stump or series of roots.

The amount of absorption that follows the loss of a tooth by extraction is very considerable, and when a large number are removed at the same time, the waste of osseous tissue is in a much greater ratio than in relation to the same number of teeth when extracted at various times. Nor is this the worst, for sometimes the waste goes on year after year, to certainly a less extent than at first, but so continuously that in some cases the tuberosity for the attachment of the lingual frenum may be seen conspicuously elevated as a prominent spine. Nor is this conspicuous waste of bone the worst possible feature, for in some instances the shock which the system receives is so great that it is sometimes long in its recovery. One such case has been brought to my notice within the last twelve months that terribly elucidates my meaning.

I learned from the patient herself that she had consulted me a year or so previously relative to her mouth, and that I had advised her to have no teeth removed, but some eight or nine substitutes inserted. She was then probably on a tour of professional interviews, and ultimately appears to have fixed on one who would do for her the largest amount of work for the smallest amount of payment. The result was that she had every tooth but two second lower molars extracted, and when I saw her again the alveolar ridge was wasted to a small and narrow line round the jaw, and she was wearing an imperfectly-fitting set of teeth, arising from the large amount of absorption that had gone on since the substitutes had been inserted.

One prevailing idea the patient had was that he who had extracted her teeth had ruined her for life, that he had deformed her in face and body, that she was fast becoming an unsightly person. To quote one of several letters that I received from her, soon after I had placed in her mouth another set. She writes:—

"I do not wish to trouble you with any correspondence, but I think my case needs an apology—I am grievously disappointed in the results. When I told you that I wished to be bigger, I was so pent up in the body that I could not understand for what cause I had been so treated and had so suffered.

"Now I find I am getting very stout every way, and that which had been brought almost to a climax, and which would have been very beneficial to me, has all dispersed, and in order to make me stouter I find my body and face are distorted. My nose is still waving to and fro, which I suppose is acting on my spine and causing it to be knotted and crooked.

"My face is all on one side, as is also my body.

"I am almost afraid to wear my teeth, the vulcanite is expanding so, and I feel that with what is going on in my mouth I am further away from having my desires realised."

The writing of one such letter as the above would be suggestive of an exhibition of feeling arising from some annoyance connected more or less immediately with the distress induced by the novel sensation of wearing an extensive set of substitutes for the first time. But when such letters are repeated and continued for a considerable period, when, added to this, the existence of the patient has become a burden to herself and friends, that medical treatment has had no power to remove the melancholy, that she has been compelled to have an attendant in constant association with her, I think we are forced to attribute this distressing monomania as the consequence of the removal of a large number of teeth and the great immediate personal change which a considerable amount of alveolar absorption induces.

Conservative dentistry is, I believe, the better surgery, and where the roots of teeth are retained in a healthy condition the mouth is preserved in a higher degree of efficiency, both for personal appearance, ease and comfort, as well as for the satisfactory application of artificial substitutes.

Unfortunately it has been too common a practice for the stumps that are left in the mouth, being either the remains of decayed teeth or others that have been excised to admit of their replacement by substitutes, to be allowed to shift for themselves. The natural channel of the dental pulp is allowed to exist either as an open chamber to be occupied with oral deposits, or to retain the slough of the dental pulp and so pave the way to future periostitis and alveolar abscess.

Nor is the dentist wholly responsible for this condition of things, inasmuch as the general anxiety of the patient is not that the mouth shall be placed in a thoroughly healthy condition, but that the greatest amount of show shall be made for the least amount of personal inconvenience. Consequently all things like decayed stumps are allowed to take their chance, and a pus-discharging gumboil is looked upon as a valued safety-valve against active pain.

It is not my intention to raise an indiscriminate determination that no tooth or stump should ever be extracted, but I do think that neither stump nor tooth should be removed that is healthily implanted in its alveolus or could be made so. Roots that are loose, roots that are inducing induration of the periodonteum, roots that are the exciting causes of a chronic inflammatory condition of the gums, or are distantly connected with obscure pains of the head and various parts of the system; teeth that are inducing irregularities in the mouths of the young, particularly when they exhibit symptoms of a rapid and overmastering decay, are such as will need the skilful application of the numerous well-made forceps, and even take the power of diagnosing when and what teeth should be retained or extracted out of the category of empirical rules.

Frequently, however, we are not consulted, and a person will rush into our operating-room and demand the immediate extraction of a fairly good organ simply because it pains. Likely as not they will pitch upon the wrong tooth, and a contest arises between the patient and his dentist as to what is right to be done, and in this, as everything else, it will be found that the stronger will prevails, for, to use the words of a patient for whom I declined to remove a sound tooth that was condemned by its owner, "The person who feels the pain is the best judge as to which tooth to refer it."

Undoubtedly there are many cases where the pain is so intense that to the mind of the sufferer the only relief is the extraction of the tooth, but in the present time, with the power in our hands of devitalising the pulp, in a large majority of cases, perhaps in all but under exceptional circumstances, more permanent and immediate relief can be given than by extraction. For assuming the worse condition of local aggravation, the pulp being destroyed, the surrounding tissues become rapidly amenable to treatment. The tooth, ceasing to pain, can readily have the pulp-cavity and roots emptied of the remaining slough, the chamber and canals being permanently plugged, and the useless walls reduced by excision to a level with the surrounding tissues.

The treatment of the anterior or single-rooted teeth, in consequence of their importance in restoring the natural appearance so perfectly, through the means of pivoted crowns, has long been under successful control.

The excision of one of these teeth when taken above the pulp chamber is comparatively a painless operation, in many cases the entire pulp coming away with the amputated portion ; the root on being plugged either with the pivot of the newly adapted crown, or by means of any water-tight plug, becomes a restoration of the parts more natural and more permanently normal than can be produced by extraction under the most favourable circumstances.

That which has been done so frequently and so successfully for the teeth with a single pulp canal is also capable of being done with teeth of a larger number of both roots and canals. Undoubtedly the molars are larger and stronger organs, and the excision of their crown, if tolerably firm, might require a greater hand power than every dentist possesses ; for the slightest deviation from rigid firmness and steadiness of hand is liable to dislocate the tooth in its socket, to give intense pain, and an after irritation that not only may require a prolonged treatment, but probably vitiate the success of the operation altogether.

The compound character of the pulps of the posterior teeth is another source of difficulty, for it is scarcely probable that the excising power shall be so equally distributed that the branches of the pulp which traverse the different roots shall be simultaneously severed ; consequently the force that ruptures the pulp of the anterior root of a molar tooth may only stretch that of the posterior, which, being done for the smallest amount of calculable time, must induce exquisite pain.

It appears to me, therefore, that the devitalization of the pulp previously to the removal of the crown is a thing to be desired, and the excision should be by a series of cuts, rather than by a single operation.

The roots of the excised tooth being clean and healthy, the pulp chamber and canals being carefully and hermetically sealed, the alveolar processes of the jaws are preserved and the mouth is retained in a condition more in accordance with its natural appearance, and less liable to vary for a long series of years than when the teeth are entirely removed.

I am aware that many practitioners advocate this mode of practice as conscientiously as their patients will admit of their doing; but I think that it would largely advance the power of their advice and give increased confidence to their treatment if the subject received a full discussion by the profession, and it went forth as the dictum of this society, that the roots of teeth retained in a healthy condition is a thing to be desired, and that the preservation of the alveolar walls is synonymous with a youthful and healthy expression of the face.

Mr. Charters White supported all that Mr. Spence Bate had said. Many troubles arise from the wholesale extraction of teeth. After a time, from absorption of the alveolar process and gum, dentures are more liable to move about, and are not so steady or so easily kept in place as when good healthy roots are present. Notably is this the case in the lower jaw. Therefore, he hung on tenaciously to the retention of even one root.

Mr. Blandy said he was in the habit of extracting all roots and teeth which could not be filled. The after extraction of roots leaves a space beneath the denture, and in which food, &c., accumulated. He advocated loading lower plates—cheoplastic work—as a means of keeping them in position, especially where the gum was very flat.

Mr. W. Gordon Jones said the retention of roots when filled was a comfort to the patient, and the shock of extraction was also avoided. He urged the maintenance of the vitality of the pulp whenever possible, and thereby keep up the integrity of the root.

Mr. Hutchinson stated that the late Mr. Sercombe used platinum and not tin, for weighting lower plates—the former metal having a very high specific gravity.

Mr. Campbell supported the views of Mr. Spence Bate. Weighted lower plates were not all that could be desired; the weight was not too agreeable.

Mr. Brownlie was convinced that while roots were present, and capable of bearing pressure, dentures were much more efficient than when the jaw was quite endentulous.

Mr. Balkwill was not so far advanced as the paper advocated, but he thought the lower front roots especially should be retained whenever practicable. He had seen several cases in which the extraction of those teeth before middle life had made the adaptation of artificial teeth almost impossible, owing to the great amount of absorption that had taken place.

Dr. Crapper advocated the retention of even loose teeth in the lower jaw ; but, at the same time, thought that the evil had to be avoided of being too conservative, especially with regard to the upper jaw.

Mr. Newland Pedley referred to excessive absorption of the alveolar portion of the lower jaw, favouring pressure upon the inferior dental nerve and other effects (neuralgic, &c.), consequent upon changes therein.

Mr. Alfred Jones said he retained every sound root, and thought that the wholesale extraction of roots should be condemned.

Mr. T. Cooke-Parson advised the retention of roots, not simply to act as buttresses for artificial plates, but for pivoting crowns upon.

Mr. Spence Bate, in reply, said the chief object of his paper was to show the advantages of the retention of healthy roots, for it was certainly desirable to retain the alveolar walls and the accompanying youthful appearance. He wished it to go forth as the opinion of the profession that stumps should be retained.

The discussion which ensued upon the reading of this paper before the Western Branch of the Association is given at page 443.

Mr. Storer Bennett read a short paper on "FURTHER EXPERIENCES WITH THE HERBST METHOD OF GOLD FILLING," in the course of which he expressed the doubt of that method being sufficiently appreciated. He showed Herbst's five hand-instruments, which were devised to avoid the loss of time consequent upon the frequent changing of instruments in the dental engine. He had found agate burnishers a great improvement upon steel ones, as were also those made of blood-stone, some of which were exhibited. The advantage of the stone instruments was in the gold not adhering to them as it does to the steel burnishers.

A brief discussion followed.

Mr. W. M. Fisher read a paper on "COMPULSORY ATTENTION TO THE TEETH OF SCHOOL CHILDREN." In the course of his paper, he said the children in this country, especially those of the working and lower middle classes which make up the bulk of our population, generally seek the aid of the dental surgeon only when driven to him by pain. Under these conditions he generally finds their teeth in a very filthy and unkept state ; so much so as to dishearten him almost in the true conservative treatment of their teeth, because of his inability to cope with the amount of decay and disease presented to him at one time, and the inability on the part of the parents to meet the necessary fees. Hence those classes are thus too often driven into the hands of charlatan practitioners, who have neither education, title, nor conservative sympathies for their treatment, but whose sole motive is mercenary. This is a state of matters both to be deprecated and deplored, though not to be wondered at when we think of the plethora of false instruction self-introduced into the advertisement columns of our daily journals.

This false instruction he would seek to counteract by the aid of cheap lectures similar to our Medical and Surgical Health Lectures, which have been so popular of late in many of our provincial towns. They would be the means of disseminating knowledge, truth and information on the teeth, and would lead to a cheap literature on the subject to come within reach of the masses of the people.

He said every child's mouth ought to be examined on its entrance into school life, and its occasional application throughout, by a thoroughly competent and qualified dentist ; no child to be allowed to commence its studies until every tooth stood an equal chance of existence with every other organ of the child's physical existence.

In cases of large families needing aid, the parents of which were in possession of small means, a well-considered provident system of relief should be adopted. Then, for those who were quite unable to pay, and needing dental aid, that should be borne by State or parochial relief, just as outdoor medical relief and education are given at present. But these are mere questions of detail. He alluded to his examination of the mouths of the boys on board the "Mars" Training Ship Institution—in the Firth of Tay—for homeless and destitute boys. The ship contains usually about 400, and in all, they are a strong healthy lot of boys, ranging in age from 10 to 16 years, when they generally leave the ship. They are in receipt of everything which is possible to develop a strong and burly type of manhood; yet, on a minute examination of every boy's teeth, of which he has the tabulated data, what was the result? Only 80 of them had absolutely perfect mouths, leaving on an average 300 of them in need, more or less, of the care of a dental surgeon, and this, it must be remembered, is a continually shifting population, a new crew being on board nearly every fourth year. The superintendent, Capt. Scott, informed him that boys are frequently returned to the ship, when drafted off to gain entrance to the Royal Navy, from inefficiency of their dental armature.

At the Dundee Industrial School for Girls, containing in number 85, ranging in age from 7 to 16 years, he found the children suffering considerably from tartar, and also injury from the lack of attention during the second dentition, which, from the youthfulness of its inmates, takes place more or less wholly while they are under the care of this institution. Out of the 85 girls he found 15 or 16 with very perfect mouths, leaving 60 or so all requiring watchfulness or treatment.

Referring to that state of affairs as it affects adult life, he said that at the port of Dundee, where at least 800 men are drilled per annum for the Royal Naval Reserve, about one-fourth of the seamen who present themselves to join the service are rejected. Rather a severe hardship to those men. In all likelihood the majority of these cases would have been amenable to treatment if attended to in early days, when they would likely have learned to take care of these organs and take an interest in keeping them.

There is no excuse if the educated dentist fails in adopting all the principles and practice of advanced dental surgery, as is now known to us as a profession, in public appointments just as well as in private practice. Whatever may be the class of dental appointments in the future, he would have them all well remunerated, according to the amount and value of the service rendered, so that no operator might refrain from the faithful performance of his duty, which will bestow the benefits of our education on humanity at large. In contending for this compulsory care to the teeth of school children, it will necessitate the appointment of dental surgeons to all schools under the Educational and Home Office Departments of our country. This would be the first step in the right direction for the beginning of a new era in the correct keeping of the teeth of the bulk of our people.

(To be concluded in our next.)

THE

DENTAL RECORD.

VOL. V. NOVEMBER 2, 1885. No. 11.

A CASE OF PERIODONTITIS CAUSED BY ARSENIC.

By Clifford Batten, L.D.S.I.

Some time back a lady, æt. 30, called on me to have a lower molar stopped, as she was going from home the following day for about two months. On examining the tooth, which had a large crown cavity, I found the pulp in a suppurating condition, and knowing that the patient would not be in town for some time, I resolved to follow Mr. Coleman's mode of treatment.

Having adjusted the rubber dam and excavated the cavity, I applied to the pulp about $\frac{1}{16}$ of a grain of arsenic, on a cardboard cap soaked in creosote, and filled up with Hill's stopping.

During the first twelve hours she experienced slight pain, which gradually died away, and the tooth became quite comfortable for over a fortnight, when it again began to feel uneasy, but *not painful.* This continued for three days, and the patient, who is highly nervous, returned to me (exactly three weeks from the time of filling), saying that her tooth had that morning suddenly become loose.

On touching, it moved with a rattle. I lifted it out, and discovered that all signs of pericemental membrane had disappeared, and that the fangs and socket were bleached quite white.

The place from which the tooth came did not bleed at all. I have since been syringing the cavity out with Condy, and it is now gradually healing up.

The peculiarities of this case are the absence of pain, the rapidity with which so small a quantity of arsenic acted, and the sudden loosening of the tooth. It also shows the uncertainty of such treatment, and the damage that may be done by following it.

ON THE ETIOLOGY AND PATHOLOGY OF THE SO-CALLED "DENTIST'S LEG."

By George Johnson, M.D., F.R.S., Professor of Clinical Medicine and Senior Physician to King's College Hospital.

(From "The Lancet.")

At the meeting of the Odontological Society in June, 1884, Mr. Oakley Coles read an interesting paper on the "Maintenance of Health amongst the Practitioners of Dental Surgery."* The reading of the paper was followed by an instructive discussion, in the course of which mention was made of the pain in the back and legs resulting from over-fatigue in muscles which are engaged in maintaining the body for a long period in one constrained position. One speaker, Mr. Dennant, of Brighton, said he had himself "suffered from what their medical friends were learning to call the 'dentist's leg.'" About two years since, the pain became unbearable after standing three or four hours, resembling very much the application of scalding water to the outer part of the thigh in the region of the external cutaneous nerve. It seemed to be due to nervous exhaustion from the undue strain thrown upon the part. Medical friends and common sense suggested rest as the remedy, and this he secured by means of the Lyons stool. He had used this for about two years with great benefit, and could now get through a day's work with comparative comfort.

Some time since I had my attention directed to this subject in consequence of having been consulted by a dentist, about thirty-five years of age, who described to me a sensation of numbness in one thigh, which he feared might be a precursor of paralysis. I soon, however, relieved him of his anxiety by giving him what I have no doubt is the true explanation of the perverted sensation. Our every-day experience teaches us that over-strain and fatigue may be direct causes of pain in the muscles concerned; but, besides this, the long-continued rigid contraction of the muscles which are engaged in maintaining such a fixed position as the operating dentist often has to assume must greatly impede the circulation, not only through the muscles, but also through the integuments. As the alternate contraction and relaxation of the muscles—in walking, for instance—assists and quickens the circulation, so the state of fixed and rigid contraction must obviously impede and retard the circulation, by exerting a continuous pressure upon the bloodvessels, and more especially upon the soft and easily compressed veins. The impeded circulation affects not only the muscles, but also the skin and subcutaneous tissues, and the nerves which supply the different tissues ; and one result of a defective circulation through the nerves is to cause various perverted sensations—such as numbness, a sensation of "pins and needles," or a painful feeling of heat and scalding. The immediate cause, then, of the painful sensations experienced and so graphically described by Mr. Dennant appears to be, not as he suggests, "nervous exhaustion," but perverted nerve function, directly due to a mechanical impediment to the circulation through the rigidly contracted muscles and their associated nerves. It is probable, too, that direct compression of the nerves by the firmly contracted muscles may have some influence in the causation of the perverted sensations referred to the cutaneous terminations of the nerves.

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* Transactions of the Odontological Society of Great Britain, vol. xvi., No. 8, new series.

I have often been consulted by men and women beyond middle age who have been alarmed by a feeling of numbness, or "pins and needles" in the extremities. In these cases the defective circulation, which is the direct cause of the perverted sensation, is often the result of an enfeebled condition of the heart, with or without excessive general obesity, and often with more or less general emphysema of the lungs.

To return to the "dentist's leg." The obvious means of prevention and of cure consist in rest for the overstrained limb, or such a frequent change in position as is equivalent to a certain amount of rest. Standing in one position is notoriously more fatiguing than walking, and for the obvious reason that while in standing one set of muscles is in a constant state of active contraction, the circulation through them being thereby retarded and enfeebled, walking involves alternate contraction and relaxation of the muscles, with an invigorated and quickened circulation.

More than one speaker during the discussion referred to the benefit to be derived from some form of active muscular exercise after the day's work. It is probable, too, that systematic friction and massage of the affected limb would be beneficial.

THE PHYSIOLOGICAL ACTION OF MESMERISM.

A Lecture delivered at, and recently published in the "Proceedings" of, the Royal Institution of Great Britain, on March 14th, 1884.

(Concluded from page 372).

I HAVE spoken of the frog as being hypnotised or mesmerised. Let us consider what is meant by this. I think it is obvious that the animal does not remain passive from any astuteness on its part; it is incredible that the frog, finding its efforts to escape ineffective, should make up its mind to remain quiet, and should, although at liberty to move, stay still for hours, becoming more and more determined as time goes on to take no notice of noises, of flashes of light, and of pinching of its skin. On the contrary, it is, I think, obvious that in some way its will has become paralysed. In order to attempt to explain how this is brought about, we must consider another aspect of reflex action, an aspect which is very little understood.

You remember that a brainless frog will, when its leg is gently pinched, kick out the leg; but if just previously some other part of the body has also been pinched, one of two opposite things may take place: the leg may be kicked out more quickly and vigorously, or it may not be kicked out at all. In both cases the nerve centre involved in producing the movement of the leg receives an additional impulse from another nerve centre, but in one case the additional impulse increases the activity of the nerve centre involved in the reflex action, in the other case it annuls this activity—there is, to use a physiological term, an *inhibition* of the "reflex" nerve centre.

To take another instance, a frog without its cerebral hemispheres, but with the rest of its nervous system, will croak when its sides are gently touched; but if at the moment of touching it, its leg be pinched, it moves or jumps, but does not croak. Here the motor centre which causes the movements of the muscles in croaking, receives nervous impulses from two sensory centres; one of these being set in activity by touching the sides of the frog, the other from pinching its leg. The impulses of the former tend to make the motor centre active, and so produce a croak; but, the exciting effect of these impulses is annulled by the impulses coming from the latter centre; in other words the nerve centre involved in croaking is inhibited. Inhibition by impulses proceeding from the cortex of the brain occurs every day of our lives. The "will" is perpetually being brought into play to inhibit some nerve centre or other. For example, you may be on the verge of yawning, when it suddenly occurs to you that it would be better not to do so; you suppress the yawn without moving a muscle. What happens is this. An inhibitory nerve impulse is sent from the cortex, and puts a stop to the indiscreet activity of a nerve centre elsewhere in the brain. Further, when the cortex is set in activity in a particular way by one impulse, another impulse reaching it may inhibit the first activity, or in terms of the localisation theory, one nerve centre in the cortex may send out inhibitory impulses to any other nerve centre of the cortex.

I need not farther multiply instances of inhibition. I wish, however, to lay stress on this, that it is highly probable that impulses travelling from any peripheral nerve-ending to a nerve centre, or from any one nerve centre to any other, may, under certain circumstances, diminish or annul the functional activity of the nerve centre, that is, may inhibit it. And there is equal reason to believe that, under certain other circumstances, the effect produced will not be inhibition, but an increase of activity of the centre. The exact conditions which determine whether one effect or the other takes place, have not as yet been made out. For the present the facts must suffice us. We may now return to the mesmerised frog.

Whatever the will may be, its action is accompanied by a certain activity of the cortex of the brain; if this activity is prevented from taking place, the will can no longer act. From the physiological standpoint, then, the mesmerised frog lies motionless because an inhibition of a particular activity of the nerve cells of the cortex has taken place. We may distinguish two chief causes of this inhibition.

The tacti stimuli sent to the central nervous system when the frog lies on its back are obviously different from those sent when the frog is in its normal position. The unusual nerve impulses travelling from the skin in the unusual position of the frog are inhibitory nerve impulses. There is reason to believe that they act first on some lower centre of the brain, and that from this, impulses are sent which diminish or annul the activity of the cortical nerve cells which is necessary for the exercise of will.

The second chief cause of inhibition is in the cortex itself.

Handling the frog in the way which is done when it is mesmerised, produces a certain emotional condition which we may call fright. But when the animal is frightened, the nerve cells of the cortex are set in activity in a special manner. This mode of activity inhibits other modes of activity, and the will is paralysed.* We cannot at present, I think, put in any more definite form the effect of one state of the cortex of the brain upon its other possible states. We do not know enough of the relations of the cortex of the brain to the psychical functions to say more. In some cases fright seems to play a very small part, if any, in producing the effect. That it is not an essential factor is, to some extent, confirmed by the fact that a frog without the cerebral hemispheres can be easily mesmerised ; it is difficult to conceive of the animal in this state being very much frightened.

It will be remembered that reflex action from all parts of the body is diminished in the mesmerised frog. After a time, then, there is a marked inhibition of activity of the whole nervous system. Now in the brainless frog placed on its back there is no such diminution of reflex action ; hence in the intact hypnotised frog the spinal cord must be inhibited by impulses coming from the brain ; from which we may conclude that centres inhibited in their own proper action, nevertheless send out inhibitory impulses to other centres. There appears then to be an irradiation of inhibitory impulses, just as we have seen that there is an irradiation of exciting impulses.

There are two other features in the hypnotised frog which I must mention, although time will not allow me to discuss them. It sometimes happens that soon after a frog has been hypnotised, reflex actions, instead of being more difficult to obtain than normally, are obtained more easily. Preceding the condition of reflex decrease there is a condition of reflex increase. Further, it sometimes happens that the hypnotised frog, instead of lying with its muscles flaccid, passes into a cataleptic state, so that its limbs tend to remain in any condition in which they are placed. Both the condition of reflex increase and that of catalepsy are more marked in man.

Before passing to mesmerism in man I will show you two other instances of hypnotism in the lower animals. The alligator which you see here behaves very much like the frog. It has, however, less tendency to become cataleptic. After a brief struggle, it becomes quiescent and its limbs slowly relax; its mouth may then be opened, and a cork placed between its teeth, without giving rise to any voluntary movement on its part. It may be kept for a considerable time in this limp condition by gently stroking the skin close to its eyes.

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* The term "paralysis of the will" is here used to include the state in which there is an effort of will, but in which the effort is not followed by a despatch of nervous impulses from the cerebral hemispheres to the lower nervous centres.

So far as I have observed, the hypnotic condition in birds and in lower mammals is not capable of any great development. It may last ten minutes, but rarely longer. In these animals, too, the emotional condition is probably the chief factor in producing the inhibition. Of impulses from peripheral sense organs, tactile impulses seem to be most effective in the lower mammals, as in the rabbit and guinea-pig, and visual impulses in the bird. The pigeon which I have here, remains longest quiescent when, after it has been held for a minute or two, I bring my hand slowly up and down over its head.

In man the phenomena of mesmerism are of a very much more striking character than they are in the lower animals. Speaking generally, this seems to be due to a greater interdependence of the various parts of the nervous system in the lower animals. In these, when any one centre is stirred up by exciting impulses, an irradiation of exciting impulses is apt to take place to all other centres, and the mesmeric state is in consequence apt to be broken. And on the other hand, when a centre is inhibited, an irradiation of inhibitory impulses is apt to take place, and the whole nervous system is in consequence apt to be inhibited. Hence the activity or suppression of activity of particular parts of the central nervous system, which forms so conspicuous a feature of mesmerism in man, can be only partially produced in the lower vertebrates. Even in man there is very considerable difference, in different individuals, in the ease with which particular nerve centres can be excited or inhibited without other centres being similarly affected. But apart from this the fundamental features are the same, whether a man or a frog be mesmerised. The primary point is, as I have said, the paralysis of the will, that is, the inhibition of a certain activity of the nerve cells of the cortex of the cerebrum.

In man, as in the frog, this inhibition may be brought about either by impulses proceeding from the peripheral organs of sense, or by impulses originating in the cortex itself. Of the former class, tactile and visual impulses are most effective, although the mesmeric state may be produced by auditory and probably by other impulses. A man may, then, be mesmerised by passing the hands over or close to the skin, or by making him look steadily at an object, or listen intently to a sound.

Whether the inhibitory impulses so set up produce inhibition or not, depends upon the condition of the whole of the nervous system. The effect of the inhibitory impulses may be counteracted by exciting impulses coming from other parts of the central nervous system. In many people the exciting impulses are always sufficiently strong to overpower the inhibitory ones, and such people cannot be mesmerised. In others, the inhibitory impulses must be kept up for a long time, and repeated on successive days, before they acquire sufficient force to overcome the exciting ones. Such people are mesmerised with great difficulty.

The great majority of people cannot be mesmerised unless they consent to fix their attention on some particular object. This fixing of the attention, speaking generally, seems to be a voluntary exclusion of exciting impulses, leaving thus the inhibitory ones an open field. Idiots, who, on account of the lack of co-ordination of their nerve centres, cannot fix their attention for any length of time on any one object, cannot as far as I know be mesmerised. Now this, now that part of the brain becomes active, and exciting impulses are sent out which overpower the inhibitory ones.* Inhibition from impulses arising in the cortex itself are rare unless the patient has been previously mesmerised. Some such cases, however, do occur. But in people who have been previously mesmerised inhibition in this manner is of not unfrequent occurrence; within limits, the more often the changes in the cells accompanying inhibition have been produced, the easier they are to reproduce. Those who have often been mesmerised may fall again into this condition at any moment, if the idea crosses their minds that they are expected to be mesmerised.

Thus, if a sensitive subject be told that the day after to-morrow, at half-past nine he will be mesmerised, nothing more need be done ; the day after to-morrow at half-past nine he will remember it, and in so doing will mesmerise himself.

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* It is said that some persons, whilst they are sleeping, can be brought by means of passes into the mesmeric state. It would be interesting to observe if this can also be done with insane people.

An instance sent by M. Richer to Dr. Hake Tuke, presents, it seems to me, an example of inhibition from the cortex which is of a somewhat different class, and more allied to that which occurs in birds and lower mammals. A patient was suspected of stealing some photographs from the hospital, a charge which she indignantly denied. One morning M. Richer found this patient with her hand in the drawer containing the photographs, having already transferred some of them to her pocket. There she remained motionless. She had been mesmerised by the sound of a gong struck in an adjoining ward. Here, probably, the changes in the cortex, accompanying the motion which was aroused by the sudden sound at the moment when she was committing the theft, produced a widespread inhibition—she was instantaneously mesmerised.

I will show you the method of mesmerising which is, perhaps, on the whole, most effective ; it is very nearly that described by Braid. I have not time to attempt a mesmeric experiment to-night, it is the method only which I wish to show you. With one hand a bright object, such as this facetted piece of glass, is held thus, eight to twelve inches from the subject, so that there is a considerable convergence of the eyes, and rather above the level of the eyes, so that he is obliged to look upwards. The subject is told to look steadily at the piece of glass, and to keep his whole attention fixed upon it. This position is kept up for five to ten minutes ; during this time the pupils will probably dilate considerably, often assuming a slight rhythmic contraction and dilation ; when this is the case the free hand is moved slowly from the object towards the eyes. If the subject is sensitive, the eyes will usually close with a vibratory motion. In some cases the subject is then unable to open them, and the usual mesmeric phenomena can be obtained. If when the operator brings his hand near the eyes of the subject, the subject instead of closing them follows the movements of the fingers, the whole proceeding is repeated, but the subject is told to close his eyes when the fingers are brought near them, but to keep them fixed in the same direction as before, and to continue to think of the object and that only. The operator then for some minutes makes " passes," bringing his warm hands over and close to the face of the subject in one direction. When the subject is inclined to pass into the cataleptic state, an indication of his condition may be obtained by gently raising his arm ; if he is beginning to be mesmerised, the arm remains in the position in which it is placed. If the arm falls, the mesmeric state may not infrequently be hastened on by telling the subject to keep his arm extended whilst he is still gazing at the object, or whilst the passes are being made. And that is the whole of the process. The man thus mesmerised sinks from manhood to a highly complicated piece of machinery. He is a machine which for a time is conscious, and in which ideas can be excited by appropriate stimulation ; anyone acquainted with the machinery can set it in action.

The distinguishing feature of the earlier stages of mesmerism in man, is that by slight stimulation any one centre can be easily set in violent activity, and its activity easily stopped, without the activity spreading to other distant centres. It is on this that the mesmeric phenomena usually exhibited depend ; with most of these phenomena you are no doubt familiar, so that I need mention one or two only.

Complicated reflexes may be produced in various ways, just as we have seen is the case with a frog even when without its cerebral hemispheres. Thus Braid mentions that on one occasion an old lady who had never danced, and who indeed considered it a sinful pastime, when mesmerised began to dance as soon as a waltz tune was played.

A statement made to a subject will often produce implicit belief notwithstanding the evidence of his senses. I remember telling a subject that I was about to bring a hot body near his face, and he was to tell me when it was painful. I put my finger on his cheek, upon which he cried out violently that I was burning him. When he was awakened he remembered that I had touched him with something very hot. The idea I had given him was remembered, the evidence of his sense of touch was disregarded. Even in ordinary, apparently wakeful, life an idea may produce a belief in no way borne out by the evidence of the senses. Dr. Beard relates that once when crossing the Atlantic, the steamer he was in ran into a sailing-vessel. It was at night, and amidst the roar of the wind, the shrieks, and cries, and prayers of the passengers, the cry went forth that the steamer was stove in and the bow sinking; straightway all eyes were turned to the bow, and to every eye it seemed to be sinking. " I shall never forget," he says, " how it gradually lowered in the darkness." In fact, however, the vessel was uninjured, and the bow did not sink at all. Here probably the majority of the people present passed simultaneously into a condition resembling the mesmeric condition ; the idea presented to them by the cry "the bow is sinking" being more powerful than the ideas aroused by the objects actually seen.

But even in the absence of strong emotion, it may happen that an idea suggested by a statement may be more powerful than the proper sensory impression. There are some persons, apparently perfectly trustworthy, who nevertheless, if they were told to look closely at the top of this bell jar and see the faint flame coming from it, would very soon see the flame quite distinctly. In health, as well as in disease, there are many partial revelations of the condition produced by mesmerism.

In some subjects the sensibility of the skin to variations of temperature is very greatly increased, so that the contour and size of an object which is brought near the skin can be recognised by the alteration in the feeling of temperature of the part. The size and contour of an object, such as a book or a coin, being thus known, the subject may, of course, be able to guess that a book or coin is being held before him.

There are certain attitudes which we usually assume under the influence of certain moods or ideas. From each of the muscles concerned in bringing about any one attitude, impulses travel up to the brain, and give rise to a definite muscular sensation which comes, therefore, to be associated with a particular mental mood. In mesmerised people the production of a definite muscular sensation not infrequently produces in the mind the mood with which it is, in the wakeful state, associated. At the same time ideas may be produced corresponding to the mood, and the ideas may give rise to particular actions, such as laughing, crying, fighting.

If the head is pushed back, and the shoulders opened out, the face assumes a look full of pride or haughtiness, and if the subject be asked what he is thinking about, he will give some answer indicating what a fine fellow he fancies himself to be. If, then, the head is bowed and the shoulders contracted, the aspect of the face changes to one of humility and pity. Occasionally it happens that a slight pressure on a single muscle, which causes it to contract, will, by an irradiation of nerve impulses, produce the muscular sensations proper to a group of muscles, and this will give rise to the associated frame of mind. Thus very different feelings may be made to rapidly succeed one another in the mind of the subject by simply pressing on various muscles of the head and neck. At first sight such an experiment looks like a revival of the now happily-forgotten phrenology.

I have said that in a frog which remains mesmerised for any time there is a considerable reflex depression, *i.e.*, inhibition of the whole of the central nervous system—that there is an irradiation of inhibitory impulses. In man a similar irradiation of inhibitory impulses appears to take place. Usually a mesmerised person if left alone passes gradually, but often rapidly, into a state of torpor; consciousness disappears, memory is lost, reflex action becomes difficult to obtain; finally, it may be, there is complete anæsthesia—a limb may be cut off without producing any movement or any pain. Since this torpor comes on without anything further being done to the subject, we may conclude that here, as in the frog (but to a much more marked degree), there is an irradiation of inhibitory impulses. The primarily inhibited centres send out inhibitory impulses to all other nerve centres. Up to a certain stage, possibly throughout, any one or more centres may be brought back to a condition of activity by certain exciting stimuli, but when these cease the inexcitable condition is soon brought back by the inhibitory impulses streaming to them from other nerve centres.

The extent to which the torpid condition develops itself varies in different individuals. It depends upon the condition of the nervous system, upon the relative intensities of the inhibitory and exciting impulses. As far as our present knowledge goes, it would appear that a few only of those who can be mesmerised can be made to pass into a condition of complete anæsthesia. It is possible, however, that this may be due to the passes which give rise to inhibitory impulses not being continued long enough. Dr. Esdaile, who in India was accustomed to mesmerise his patients before performing surgical operations upon them, used to continue the passes for one to two hours, and often to repeat this for several days in succession.

In different people the order in which different centres are nhibited varies, as we should expect from the unequal development of different centres in different people. This is no doubt of influence in determining whether the general state is cataleptic, somnambulistic, or lethargic, and here, probably, the method used to mesmerise is also of considerable importance. It would seem that the cataleptic condition is more likely to be developed when the process of mesmerisation involves a strain on the eyes of the subject than when he is mesmerised by passes. Not much attention, however, has as yet been directed to this point.

There can, I think, be no doubt that mesmerism may help, and sometimes cure, persons suffering from certain diseases of the nervous system. It is not in our power to make any accurate statement of the way in which this is brought about; but since disease may be the result of either an over-activity or of an under-activity of any part of the central nervous system, it is reasonable to suppose that a beneficial effect will follow the employment of a method which allows us to diminish or increase these activities as we will. This is a side of the question which is of the greatest interest both to physicians and to physiologists—to physiologists, since it bears directly upon the problem of the influence of the nervous system on nutrition. There is good reason to believe that by directing attention strongly to any particular part of the body, the nutritive state of that part of the body may be altered. The determination of the actual way in which this is brought about is full of difficulties, but the following way is at least theoretically possible. It may be that the nerve centres connected with the tissue in question are made unusually active, and that they send out nerve impulses of a trophic nature, that is, impulses which directly control the nutrition of the tissue. The alteration in the tissue caused by its changed nutritive state—its changed metabolism—may conceivably be either beneficial or detrimental to the whole organism: it may give rise to a diseased state, or get rid of an existing one.

The modern miracles of healing, wrought in persons in a state of religious enthusiasm, offer a field for investigating this problem; the field, however, is a particularly bad one, and chiefly because so many people concerned regard any careful examination of the subject as impious. But in mesmerised persons it seems probable that such investigations could be made on a fairly satisfactory basis. Men when mesmerised gradually lose remembrance of those things which they remember when they are awake, but not infrequently other things are remembered which are forgotten in the waking state.* This is normally the case with a person who has been previously and recently mesmerised. He may then remember little else than what took place in the corresponding stage of hi previous mesmerisation. In a certain state, then, an event or a command will produce in the central nervous system those changes which are necessary for the event or the command to be remembered later, without ever rising to consciousness in the waking condition. Thus a command to do a particular thing, given to a subject in this mesmeric stage, may be carried out when he awakes, although he is quite unconscious why he does it. We may say that such an act is one of unconscious memory; but it is, I think, something more than this. The subject is usually uneasy and preoccupied until the thing is done; he is to a greater or less extent unable to fix his attention on other things; he is, in fact, in a state of unconscious attention to an unconscious memory. This brings us to our point. It suggests that if a subject in a certain stage of mesmerisation be told that in a few days a sore will appear upon his hand, or conversely that a sore already there will disappear, the conditions which accompany conscious expectation and attention, will to a certain degree be established; and the trophic influence of the nervous system on the tissues may be tested in a manner which puts the experiment fairly within the control of the observer, and to a certain degree excludes imposture. Such an experiment has obviously some drawbacks, it would probably only succeed, if it succeeded at all, with a person whose nervous system was in a state of unstable equilibrium; and it can hardly be expected that the effects would be so striking as when conscious expectation is also concerned. Still, observations of this kind are well worth attention, on account of the medical, the physiological, and the psychological issues involved in the results.

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* A case is recorded by Braid of a woman who, during natural somnambulism—which is almost identical with a state that can be produced by mesmerism—could re-

A lightly mesmerised subject can be easily brought back to a normal condition by a sudden slight shock, by sprinkling water in the face, or by a current of cold air. These give rise to exciting impulses which arouse to normal activity the inhibited parts of the brain; just as we have seen that any other part of the central nervous system can be aroused to activity by slight exciting im-

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peat correctly long passages from the Hebrew Bible, and from books in other languages, although she had never studied any of these languages, and was quite ignorant of them when she was awake. At length, however, it was discovered that she had learnt the passages when she was a girl, by hearing a clergyman with whom she lived read them out aloud.

pulses. There is no mystery in this, beyond the mystery which lies in the relative action of all exciting and inhibitory impulses. The power of responding in strikingly different ways to weak stimuli differing in kind, or to stimuli apparently of the same kind, but differing in intensity, is not peculiar to the nervous system of man ; it is a power possessed by the nervous system of all animals, and indeed not improbably by all living substances. This has already been touched upon in what I have said of inhibition ; but I will give you one or two other instances of the dissimilar effects produced by slight, and apparently not very dissimilar, stimuli, instances which are especially pertinent to the subject of mesmerism. These we owe to Heidenhain.

When morphia is given to a dog, and the animal is left undisturbed, it passes into a condition resembling sleep ; but a little investigation usually shows that the condition differs in certain notable respects from sleep. Whilst consciousness, as far as can be told, is gone, and voluntary movement is abolished, many reflex actions can be obtained much more readily than in the waking state ; moreover, there is a tendency for the muscles which contract in a reflex action to remain contracted, the nerve centres when set in activity remain active for a considerable time, and continue to send out impulses to the muscles, which in consequence are kept contracted ; in other words, the reflex contraction produced by a slight stimulus applied to the skin is of a tonic instead of a tetanic nature. Now this tonic contraction can be brought to an end by various slight stimuli ; for instance, by lightly stroking the skin over the contracted muscles, by gently tapping the contracted part, by blowing in the face of the animal, or by stimulating the cortex of the brain by a weak electric current. Nevertheless, the acts just mentioned may, when the muscles are not contracted, cause or help to cause their contraction. I will give an instance of this. Electrical stimulation of a definite part of the cortex of the brain causes a tonic contraction of certain muscles of the leg, in consequence of which, let us say, the leg is bent and remains so. Now we have seen that passing the hand over the skin of the leg will cause it to unbend ; well, if the cortex of the brain be stimulated with an electric current, not quite strong enough to produce of itself bending of the leg, the bending may at once be produced by gently stroking the leg at the same time as the cortex is being stimulated. Of a similar nature is the effect of electrical currents of different strengths. When a limb has been brought into a state of tonic contraction by electrical stimulation of a certain part of the cortex of the brain, a weaker electrical stimulation of the same spot of the cortex will bring the tonic contraction to an end.

The phenomena just described as occurring in a dog under the influence of morphia, closely resemble those often observed in human beings when mesmerised. Commonly in a mesmerised person the arm, let us say, may be made to bend by gently stroking the skin over the appropriate muscles; give a slight tap on the arm, and it relaxes. Braid observed in some subjects that if a limb was made rigid by passing the hands over it, and if it was left extended for a short time, then the repetition of the same act of passing the hands over the limb caused the rigidity to disappear. It is unnecessary, I think, to consider in detail the corresponding states in the narcotised dog and the mesmerised man; enough has been said to show that in both certain slight stimuli produce, sometimes excitation, sometimes inhibition.

It must, however, be noted, that our conception of inhibition is not rendered clearer by these facts; for it would appear from them that a nerve centre may be excited or be inhibited by the same nerve impulse, the result depending upon the condition of the nerve centre. This is not a necessary inference, but it is perhaps at present the most convenient working hypothesis. A certain group of facts, indeed, may be held together and receive a provisional explanation by saying that in some conditions of the central nervous system, a stimulus excites a nerve centre if it is quiescent, and inhibits it if it is active.

It seems to me probable that what is called the "transference of contracture" and the "transference of sensation" are of the same order of facts. These phenomena are exceedingly curious. Suppose that the left biceps of a mesmerised person be gently stroked or pressed, so that it contracts and remains so. The continuous contraction of the muscle is called contracture. In consequence of the contracture, the arm is kept bent. Suppose that the biceps of the other arm be gently stimulated, we may get a transference of the contracture, *i.e.*, the right biceps becomes contracted and the right arm bent, whilst the left arm which previously was bent, falls flaccid. Similarly there may be a transference of sensation; thus the right arm say is rendered insensitive, so that pricking it with a needle does not give rise to any sensation ; on the back of the right hand, a piece of metal, such as a two shilling piece, is now placed, and left for a short time. On removing it, it is found that the spot of skin which was in contact with the metal has become sensitive, so that the prick of a needle is at once felt, but that the corresponding part of the other hand has become insensitive, so that pricking it with a needle produces no sensation.

The observations of this kind have hitherto been made almost, though not quite exclusively, upon patients suffering from certain diseases of the nervous system, and the facts have been described as occurring both in the wakeful and in the mesmeric state. The proximate explanation appears to be, to take the case of transference of sensation just mentioned, that the gentle tactile stimuli caused by the pressure of the coin on the skin, reaching an inhibited centre sets it in activity, and the sensibility of that part of the skin is restored, but the stimulus passes on to the corresponding and hitherto active centre of the opposite side of the body, and this is inhibited.

Here I must leave the subject. I have not attempted to give an account of all the phenomena of mesmerism ; I have taken those phenomena which seemed to me to be the least easy to understand, the most liable to misconception, and have attempted to show that they resemble fundamentally certain simpler phenomena which can be observed in lower animals. I have further attempted to string together the various facts upon a thread of theory, which may be briefly summed up as follows :—

The primary condition of mesmerism is an inhibition of a particular mode of activity of the cortex of the brain, in consequence of which the will can no longer be made effective.

This inhibition may be brought about by nervous impulses coming from certain sensory nerves, as those of sight, touch, hearing.

It may also be brought about by impulses or changes arising in the cortex itself.

The inhibited cortex, and probably also inhibited lower centres of the brain, send out inhibitory impulses to all other parts of the central nervous system, so that the mesmerised man or animal gradually passes into a state of torpor, or even of complete anæsthesia.

The phenomena of the excitable stage of mesmerism are proximately determined by the possibility of exciting any particular centre alone, without exciting at the same time other centres by which its activity is normally controlled. In lower animals this stage is less marked in consequence of a greater interdependence of the various parts of the central nervous system.

I would expressly state that I regard this theory only as provisional. Further, I am quite conscious that it is very imperfect. A complete explanation of the phenomena of mesmerism and of its allied states can only be given when we have a complete knowledge of the structure and functions of all parts of the central nervous system. But I have not much doubt that the explanation of the main features of mesmerism will be found when we are able to answer the question—What is inhibition ? And it is some comfort to think that the answer awaits us in the comparatively simple nervous system of the lower animals. I would not be understood to mean that variation of blood supply and various other events are of no influence in producing mesmeric phenomena ; I think, however, that these events are of secondary importance only.

Finally, I would say a word about the attitude of physiologists to animal magnetisers and mesmerists. It has sometimes been made a subject of reproach to physiologists that they have not concerned themselves more actively in investigating mesmeric phenomena. The reproach has very little foundation. The knowledge which has been gained on the subject has been gained almost entirely by medical practitioners and by physiologists, and it must be remembered that until lately most physiologists were also medical practitioners ; the division of labour is of recent date.

It is, however, true that in the beginning and middle part of this century, there were many scientific men who regarded the subject with a contempt which intrinsically it did not deserve ; but in my opinion they had much justification. A scientific man has always before him some problems which he knows he can solve, or help to solve. He has always before him a road which he knows leads somewhither. Mesmerism was long mixed up with assertions of the transmission of cerebral fluid, with impossible notions which had been banished from physiology, and with charlatanism. The scientific man of that day may, I think, be readily pardoned for supposing that the facts which were given as not more true than the theories might be equally false. Why should he leave the fruitful work his hand had found to do for that which to all appearance would be barren ?

Dr. Esdaile, who, although himself not altogether free from blame for mystifying the subject, yet did much to advance it, expresses what must have been a general feeling :—"The ignorance and presumption of man ; his passion for the mysterious and marvellous ; his powers of self-delusion, with the pranks of knaves and the simplicity of fools, have so mystified the subject, that the artificial difficulties cost us more trouble to remove than the natural ; and a mass of rubbish must be got rid of before we can reach the foundation stone of truth."

BRITISH DENTAL ASSOCIATION.

ANNUAL GENERAL MEETING AT CAMBRIDGE.

(Concluded from page 480.)

DR. C. M. CUNNINGHAM read a short paper on "CAST METAL AS A BASE," of which the following is an abstract :—

Cast metal, as improved by Watt, Weston, and others, is a bright white metal, which makes a sharp casting without any appreciable shrinking. In the economy of the dental laboratory it occupies a place between the plastic group and the swaged plate group, and has most of the virtues of both—strength, conductivity, ability to supply contour, cheapness, and ease of manipulation. It is cast in a well-dried plaster mould, similar to a flask prepared for the packing of a rubber plate. Should a flaw arise, the metal may be melted out and recast in the same mould. It may be repaired with the blow-pipe and soldering-iron, but best of all with amalgam, the free mercury being taken up by the metal.

On account of its weight it is principally useful in lower plates; though, by casting very thin, very snugly-fitting partial upper cases may be produced. Its principal fault is a tendency for isolated teeth to be loose ; this fault may be corrected by filling round the pins with amalgam. Tested by analysis, Watt's metal is a tin base alloyed with bismuth ; while Weston's metal is a tin base alloyed with cadmium, bismuth, and copper. The metals make a durable and cleanly plate.

Mr. S. J. Hutchinson read a paper, entitled "THE NECESSITY FOR TEETH AFTER FIFTY YEARS OF AGE." He referred to Sir Henry Thompson's article in the May number of the *Nineteenth*

Century on "Diet in Relation to Age and Activity," and quoted from a paragraph upon the subject in the *Journal* of the Association. The quotation was:—"The perusal of such an article as this by the general public is, we believe, calculated to do at least as much harm as good, and it is to be regretted that Sir Henry did not either choose a medical rather than a lay journal for the promulgation of his views, or else so elaborate and extend his arguments as to render them less liable to misconception by the casual reader. In dealing with the question of mastication he seems to us especially to fail in his attempt at rapid explanatory generalisation. Here his reasoning may be briefly stated as follows:—Much meat is bad for the aged, efficient mastication enables the aged to eat with enjoyment much meat, therefore it is better that old people should remain toothless, or employ artificial teeth only for the purposes of improving their appearance and articulation! But meat, though perhaps the chief, is not the only food which needs proper mastication, and we believe general experience warrants us in saying that even were the diet such as Sir Henry recommends, the assistance of efficient means of mastication would be of great importance, and its absence extremely detrimental to all but those exceptional individuals endowed with a vigorous digestion lasting unimpaired to the end of life." Mr. Hutchinson then pointed out the need for teeth after fifty years of age. To say that teeth are not necessary to masticate food is a statement that demands our consideration. It is owing to the loss of the teeth by middle life that so many evils of indigestion are due. In conclusion, he maintained that the teeth were necessary till the end of life.

In the evening there was a well-attended Conversazione and Reception of the Members of the Association and Friends by the President and Council of the Eastern Counties Branch in Peterhouse College and grounds.

FRIDAY.

On Friday morning, shortly after nine o'clock, the annual meeting in connection with the Dental Benevolent Fund was held, the chair being occupied by the President of the Association (Mr. R. White), who, in opening the proceedings, urged upon the dental profession the duty of supporting the Fund, which, he said, was calculated to be of such advantage to members of the profession.

The Hon. Secretary (Mr. Oakley Coles) read the annual report of the Fund, which was as follow:—

Your Committee beg to submit to the contributors to the Benevolent Fund of the British Dental Association the second annual report.

The Treasurer's financial statement, duly examined and certified by the auditors, extends from the foundation of the fund, in 1883, to the financial year ending June 30th, 1885.

The account of the general work of the Committee extends from June 30th, 1884, to the present time, and is made in accordance with Rule XX.

A list of contributors during the past year has been prepared, and is open to the inspection of members prior to publication.

Nineteen cases have received assistance during the past year, including two girls and three boys who are being educated, and fourteen widows and others who are being helped, of whom it is contrary to the rules of the fund that we should give any detailed account.

The education and support of the children alone involves an outlay of nearly £100 per annum, and we have several cases that must be a charge upon your fund as long as they live.

The number of those who have received your bounty could easily have been largely increased if the greatest care had not been exercised, in order to avoid giving money to the worthless and improvident. As it is, the aid that has been given has, your Committee believes, been both timely and efficient.

The number of applications that would command the sympathy of every member of the profession is steadily increasing, and, in the nature of things, they must continue to increase. Men break down sooner in health as the struggle for life becomes intensified, and die before it is possible to make any provision for wife or children Thus it has come within the duties of your Committee to bury the dead, aud then support the widow and children. These cases are not heard of, for the sorrowful are often silent, and in a large profession the dead are soon forgotten.

Whether those who are left behind can be helped by your Committee depends entirely upon your consciousness of "the burden of obligation" that should impel you to give adequate support to the Benevolent Fund. Your Committee are glad to be able to report that the following Dental Hospitals and Schools have, in answer to an application, most generously undertaken to grant Free Scholarships to those who have been educated by the fund and may be nominated as suitable candidates for admission to the dental profession.

In view of the future necessities of the fund, your Committee feel that the thanks of those present at the annual meeting should be accorded to the various members of the Staff for their great kindness in so readily acceding to the request of your Committee:—

The National Dental Hospital and College.
The Dental Hospital of London and the London School of Dental Surgery.
The Victoria Dental Hospital and School, Manchester.
The Liverpool Dental Hospital and School.
The Dental Hospital of Exeter.
The Dental Hospital of Dublin.

Local Committees for carrying out the work of the fund have been formed by the Midland Counties Branch, the Scottish Branch, the West of Scotland Branch, the Central Counties Branch and the Western Counties Branch.

Your Committee believe that these new centres of activity will be of very great service in carrying out the work of the fund.

Acting upon a suggestion made by Mr. Harrison, of Sheffield, collecting cards have been prepared for issue to the various Branches, in order that the work of the fund may be brought more directly under the notice of those members of the profession who have not hitherto given anything to its support.

The method of canvassing proposed by Mr. Harrison is a most self-denying one, as it involves a personal appeal to at least ninety-five per cent. of the entire profession, or about five thousand eight hundred people. Through the kindness of Messrs. Ash and Sons, 7,000 reports and appeals were sent out last autumn, free of any cost to the Committee, for distribution.

The thanks of the Committee are due to Mr. W. Ash, Mr. W. F. Forsyth and Mr. Ashley Gibbings for their kindness in auditing the accounts of the treasurer ; and also to Mr. Tawse, a professional accountant, who, at the suggestion of your treasurer, most kindly supervised the system of bookkeeping and prepared the balance-sheets presented to you in the report. The labours of this gentleman have been most valuable in making the financial statements both business-like and clear.

The financial statement showed that the receipts for the year 1884, were £866, and the expenditure £142, while up to June 1885 they were £156, and expenditure £165.

After some discussion, it was resolved to print and circulate the report; and it was also agreed to make an appeal to all the members of the profession to support the Fund.

THE SECRETARY'S RESIGNATION.

The President announced that Mr. Oakley Coles, the hon. Secretary to the Fund, had tendered his resignation, and, regretting that that was so, he remarked that they knew how warmly interested in the Fund Mr. Coles had been from its commencement, and how hard he had worked in establishing it upon its present basis. It would be, he was afraid, a very difficult matter for them to find anyone who would carry out the duties of the office in so ardent a manner as Mr. Coles had done, and he thought they should tender him their warmest thanks for his past services, also their hopes that in his future career he would be as blest as he had been in his present one.

Mr. Smith Turner also bore testimony to the energy Mr. Coles had shown in connection with the Fund, and said that even when his health was in a most precarious state he did not relax his efforts on its behalf for a moment. The Fund was greatly indebted to Mr. Coles, who had succeeded in making the Fund more successful than he (Mr. Turner) had anticipated. He hoped the Fund was sufficiently well established, through Mr. Coles' ingenuity, to keep up; but he hoped that Mr. Coles would also place his experience and wisdom at the disposal of those who would carry on the Fund. He had worked so hard for it that he (Mr. Turner) was sure they owed him a vote of thanks such as they could, very inadequately, pay him.

Mr. Parkinson endorsed what had fallen from Mr. Turner.

The vote of thanks was accorded by acclamation.

Mr. Coles acknowledged the vote, saying that what he had done for the Fund had been a labour of love. The members had now a sufficient amount of interest in the Fund to cause it to go on, and people were beginning to realise that the Fund was necessary, and also their obligations as to the maintenance of it in a perfectly efficient state. He expressed his thanks for the kindness he had received at the hands of those with whom he had been working, and said that in the future it would be a source of satisfaction to know that in leaving the profession he had left behind him many friends, with whom he trusted to keep on terms of intimacy. He proposed the name of Mr. Geo. Parkinson as his successor in office, by the appointment of whom the Fund would have the advantage, not only of his ability, but also the sagacity of his father. The work of the Fund was now in a fairly routine state; they had a set of books in good order, and systematically arranged details. He was sure that the Fund would go on in an efficient state.

Mr. Hutchinson seconded the nomination of Mr. Parkinson, than whom, he said, they could not have a better successor to Mr. Coles.

The motion was then put and carried.

Votes of thanks having been passed, the meeting terminated.

The remainder of the morning was devoted to Clinics, Demonstrations and Exhibitions.

At two o'clock members again assembled in the Hall of the Union Society, when

Mr. Arthur S. Underwood read a short paper on "SOME POINTS OF INTEREST IN DENTAL ANATOMY."

The paper embodied a few remarks upon some isolated observations of tooth structure, referring to erratic tubes and to interglobular areas with the surrounding calcospherites. The calcification of tooth structure was due to the fusion of calcospherites, and imperfect calcification was often seen in the form of dentine with erratic vascular canals.

There was practically no discussion.

Dr. Walker read a paper on "CAPPING VERSUS EXTRACTION OF PULP."

In reviewing the literature upon the subject, he quoted largely from the writings of Cartwright, Rogers, Tomes, Flagg, and a great many others. He then enumerated the more common escharotics and other substances used in treating the pulp and pulp canals, and compared the methods of work adopted by the best operators in England and in America. He did not advocate capping except under the most careful antiseptic conditions—spray, &c.—but urged the principle of thorough and complete extraction of the pulp, with immediate filling of root canals.

The reading of the paper was several times interrupted, and no discussion ensued.

Mr. R. Wentworth White next read a paper on "FIRST PERMANENT MOLARS," in the course of which he asserted that most jaws of the present time are not so large as those of ages gone bye. He strongly urged the extraction of the first permanent molars just when the third molars are appearing, thus giving more room for the other teeth, avoiding pressure and consequent interstitial caries, and protrusion of the teeth in the front of the mouth. He showed numerous sets of models, illustrating the effects of the treatment advocated, and also the disastrous consequences of overcrowding, which might have been avoided by the timely adoption of the principle set forth.

The Chairman invited discussion, remarking that the paper dealt with one of the most difficult problems to be met with in dental practice.

Professor Stack (Dublin), said he had been a little disappointed that no discussion had followed some of the previous papers, but the subject just treated of was so important and so interesting, that he could not refrain from trespassing on the time of the meeting for a few minutes. The greater number of the cases referred to by Mr. White were cases in which sound teeth were extracted, and he (Dr. Stack) thought that a distinction should be drawn between cases in which the teeth, which it was proposed to extract, were naturally good and in which other members of the family had sound teeth, and those in which no such goodness was to be expected. But, apart from this, he would say at once that he was entirely averse to the extraction of the six year old molars, as Mr. White advised, even though they might show a small amount of decay. He considered that what was a small amount of decay in a six year old molar was a very large amount of decay, relatively speaking, in a bicuspid. In examining a six year old molar, or a bicuspid, at the age of 13 or 14, it must be remembered that the six year old molar, if in a state of comparative soundness, had run the gauntlet of a most dangerous age, when the mouth was constantly filled with sweets and all kinds of rubbish, and if it had come out only slightly wounded, it should rather be kept in reserve as an old veteran, than that the guardianship of the mouth should be entrusted to a raw recruit, like the tooth which would come up next to it. It must also be remembered with regard to biscuspids that when once they were attacked with decay, they were the most difficult of all teeth to treat—at least, he believed that this was generally admitted to be the case. It was quite possible to treat and fill, and render useful for practical purposes, the molar, even though its pulp be exposed, but it was very seldom possible to do as much with a bicuspid. He thought, therefore, that the future before a molar was a more important one than that before a bicuspid.

He thought the six year old molars, always supposing they were not badly decayed, should not be removed before the age of twelve years. The function of these teeth seemed to be to serve as a stay and support at the back of the mouth, while the teeth in front of them were forming in line, and if they were removed before the teeth in front had come into place, it was more likely that the proper eruption of the latter would be retarded than that space would be made for them by the extraction of the molars. But he would not sacrifice this tooth, even though slightly decayed, on the chance of the twelve year old molars or the wisdom teeth coming up behind and turning out of a better or equally good constitution. To gain space when there were symptons of overcrowding, he would extract the six year old molars, only if badly decayed; but otherwise, if there were overcrowding in the front of the mouth and the canines had room to come down, he would far sooner sacrifice a bicuspid, on the ground that, in his opinion, these teeth were constitutionally frailer, and harder to keep and preserve satisfactorily than the first permanent molars. In the case of a crowded jaw with good teeth in it, he did not think it mattered very much which you took out, but he differed altogether from Mr. White in his disposition to condemn the first permanent molars without being able to form an opinion that the bicuspids and second molars are going to be sound. If a child happened to be attacked with any of the eruptive fevers, or subjected to any depressing causes during the period of life at which the four second permanent molars were being developed, these teeth would very probably come up frail and bad, and would be no substitute at all for the six year old molars, which had been extracted. He entirely agreed with the principles on which Mr. White's practice was founded, but with his method of carrying out those principles, if he had understood him aright, he did not agree.

Mr. Gordon Jones (London) thought that the overcrowding to which Mr. White had referred, might be much more easily obviated, without sacrificing good teeth, if parents could be induced to bring their children for advice at an earlier age. A great deal might be done by preserving the temporary teeth, the occasional application of an expansion plate, &c., to give a wider arch for the eruption of the permanent teeth. If the importance of early attention to the teeth were more generally appreciated, Dental practitioners would not have coming under their notice so many cases of crowded mouths.

Dr. J. S. Crapper (Hanley) remarked that, according to his experience of regulation cases, it was impossible to lay down any rule to which there would not be exceptions. No doubt there was some truth in what Dr. Stack had said about preserving the six year old molars. If they were fairly good, and if the removal of a bicuspid would answer the purpose of correcting any irregularity which might exist, or appear likely to occur, then by all means adopt that course; but cases were met with, not unfrequently, in which this would not prove satisfactory. As an exceptional case he would instance one which had come under his care about twelve months since, that of a youth whose mouth was very much overcrowded. The canines were standing out almost at right angles, the first upper molar was badly decayed on the right side, and the second molar on the left. Dr. Crapper removed the six year old molar on the right side and the twelve year old on the other, together with the right and left laterals and two supernumerary teeth, and the result was that the spaces closed up, and the teeth became quite regular without the use of any apparatus whatever. If a case presents itself just when nature is about to perform some change, as when the wisdom teeth are about to erupt, alterations could be effected in the mouth, without mechanical regulation, which were simply astonishing.

Dr. Walker said that, having had a large public school under his care for eighteen years, he could not allow Mr. White's paper to pass without a word. He was in the habit of freely extracting teeth that showed no signs of decay, and he did not scruple to extract the six year old molars when he had assured himself that the bicuspids showed a fair amount of vitality. He believed in the good effects of extraction for the relief of overcrowding, without waiting for evidences of decay, and he had had most favourable opportunities of watching the results of this method of practice.

Dr. Bogue said he should like to ask Mr. White a question with reference to the case he showed, in which the upper incisors impinged upon the lower gum. He spoke of extracting these, and he (Dr. Bogue) would be glad to know what teeth he would have extracted in that case, and what the result would have been.

Mr. R. W. White replied that at the time when the patient first came under his care almost the only teeth which touched were the four first molars; the front teeth did not articulate, and could not be got to articulate, the only pressure being between the four molars. His idea was to remove these teeth, and thus obtain room to draw back those in front, to which an examination of the models did not show any obstacle.

Dr. Bogue said he was obliged to Mr. White for his explanation, because he had had within the past year two cases precisely similar to that shown by Mr. White, and they had taxed him severely. At the same time he should decidedly take exception to Mr. White's proposed mode of treatment, which, in his own hands at all events, he should fully expect to prove a failure. He agreed with Dr. Stack on the one hand, and he found but little to differ from in Mr. White's paper on the other. It was a saying amongst themselves in America that a man who could successfully stop bicuspid teeth was a good dentist. He doubted if it was always possible to preserve these teeth, but if at the age of thirteen or fourteen the six year old molars were in fair condition it was possible to preserve them. Mr. White had asked at what age the first permanent molars should be extracted? He would reply not before twelve, and that in many cases it would be advisable to wait a little longer before deciding on their removal. The six year molar was almost invariably a larger tooth than the twelve year, and it did not do to count too certainly on the appearance of the wisdom teeth. Some of the saddest cases he had seen had been due to the failure of the wisdom teeth to come through, causing the upper teeth to shut right down over the lower. Lastly, he would call attention to a statement, originated, he thought, by Dr. Jack, of Philadelphia, that if the four first permanent molars are to be taken out, the lower ones should be taken out a year before the upper, because of the greater density of the lower jaw. Another point to which Mr. White had not alluded was this. If we bear in mind the arch of the upper jaw, looking at it from the central incisor to the wisdom tooth, it would be found that the six year old molar was the lowest point of the curve, and if this point was removed it was never recovered; the two jaws came necessarily nearer together than they were before. Hence he inclined to Dr. Stack's opinion, that except in cases of decay, it was better to remove the bicuspids.

Dr. George Cunningham said he had a model to bring forward which he thought showed very clearly the advisability of symmetrical extraction of the six year old molars. In this case the upper molar had been extracted on the left side, and the lower molar on the right. The patient had weak teeth, and if the model was examined it would be found that the amount of decay was greatest, and the fillings required were most numerous, just where the teeth had not been extracted. This was a question of great importance, and one on which he had formed a very strong opinion—not, of course, entirely from his own experience, for that had been too short as yet—but from cases he had seen corroborated by his own experience. He did not know of any operation which would produce greater results in a shorter time than this, even though a practitioner should adopt an exaggerated view of the question, and extract almost every six year old molar he met with, provided only that they were taken out at the right time. And they must be all taken out together; he believed that in taking out one tooth a man was doing an injury to himself and his patient. A single tooth ought never to be extracted, for the occlusion and articulation might be most seriously affected; he must take out at least a pair, and in the majority of cases the four. He invited their attention to the model, in which he himself took the greater interest, because he knew the operator; he was a man for whom he had the greatest respect as a teacher; but he believed that on this question of the extraction of the six year old molars he was quite in the wrong.

Mr. White, in reply, said that the specimen showed by Dr. Cunningham had its counterpart amongst those on the table. The object he had in view in his short paper was to show that at no certain age, according to his experience, could such and such a tooth be removed; but that when signs of crowding showed themselves—*i.e.*, when the space left between the lateral and the six year old molar was clearly insufficient for the two bicuspids and the canine—the molars should be removed. So that, instead of laying down a fixed law as to the age at which these teeth should be extracted, he would say, directly the third tooth begins to show that it is one for which there is not room, at once remove the six year old molar. If this was done oftener he felt sure there would not be so many cases of interstitial decay between the bicuspids, which was, as Dr. Stack had remarked, very difficult to treat. He believed it was not the difficulty of the operation, but the cracking and starring produced by pressure which caused these cases to be so unsatisfactory. The decay might be thoroughly excavated, but the cracks remained, not only in the enamel but in the dentine, and after the tooth had been carefully stopped the trouble began afresh, and the operation had to be repeated. There was one point which appeared to have been overlooked by the speakers, viz., that if space was wanted a much larger space was gained by the extraction of the first permanent molar than by the removal of a bicuspid; and if a tooth had to be sacrificed, it was quite as well to make sure of getting the amount of space required. Again, he did not see that as a rule much was gained by the eruption of the wisdom teeth; on the contrary, these teeth often produced as much trouble as did the second bicuspids or the canines. The removal of the canine or the bicuspid would not give sufficient room for the wisdom teeth to come through, whilst, with reference to Dr. Bogue's remarks on the consequences of imperfect eruption of these teeth, he could only say that he had never seen a case in which the six year old molars had been removed in which there were not also fairly good wisdom teeth. This might seem a strong statement to make, but it was a point to which he had paid special attention, and he gave it as the result of careful observation during sixteen years of practice. He would add that he began practice rather impressed by a prejudice against the removal of the six year old molars. The wave of conservative dentistry, just setting in at that time, led him to desire most thoroughly to preserve these teeth, and to stop them, and he feared that a good many of his patients had suffered thereby. However, as the result of the experience thus gained, he had now come round to what he believed to be the sounder practice, viz., in all cases of crowding of the second bicuspids or canines, to remove the six year old molars as soon as the third tooth begins to show itself, and decay between the bicuspids will never be met with.

SATURDAY.

Mr. F. Harrison read a paper on "ANTISEPTICS IN DENTAL SURGERY." He referred to the works and writings of Lister, Underwood, Miller, &c., and said that if micro-organisms do not cause dental caries they must, at all events, be taken into consideration in its treatment, and, therefore, the use of antiseptics. He then detailed his own method of their application in a simple cavity and also in cases of pulp exposure and disease, giving the results of his experiments with various solutions of iodoform. He had found iodoform of commerce adulterated with picric acid.

Mr. Spence Bate thought the paper was in the right direction of enabling us to find something that patients themselves could use to keep down micro-organisms, and thereby the diseases which arise as a result of, or are concomitant with, their existence, as in pyorrhœa alveolaris.

Mr. Sewill controverted the too prevalent idea that the tooth-pulp is a mystery, and maintained that the treatment of it in disease should be based upon the light of the scientific research of to-day. He thought Mr. Harrison's paper a valuable contribution in that direction. As he had written years ago, so he still recommended the use of absolute alcohol to sensitive dentine and pulp canals, it being less irritating than carbolic acid. He also spoke in favour of iodoform and of bichloride of mercury in solution.

Mr. Oakley Coles spoke of the necessity of freely opening up the pulp canals to favour the ingress of the medicinal agent used. He thought the essential oils very penetrating and effectual, readily travelling up small and tortuous canals. The reparative action of the tooth-pulp was much less than such tissue as the medullary matter of bone, therefore the need for even greater precaution.

After some other observations upon the question,

The President made a few remarks as to the meeting in London next year and the President-elect, and votes of thanks having been accorded, the meeting adjourned.

THE DINNER.

The Annual Dinner was held on Friday evening, in the Hall of Caius College; Mr. Richard White (President) occupied the Chair. After an excellent dinner, which was well attended by the members of the Association, and the usual loyal toasts had been duly honoured,

Dr. Smith, LL.D., proposed "The University of Cambridge." It would be quite unnecessary, he said, for him to expatiate at any length on the subject of this toast before such an assembly. He need not go back to the old legends connected with the origin of the University, or attempt to sketch the history of the commonwealth of seventeen colleges as it dated from the reign of Edward I., but would at once refer to the important code of statutes enacted so recently as 1882. For, although the University of Cambridge could well boast of an ancient and honourable name and fame, it was only of later years that it had shown that more practical tendency which was the characteristic spirit of the age in which we lived, and had introduced many material and essential changes in its teaching and administration. In the onward march and advancement of the progressive sciences changes were inevitable. The human intellect would not consent to be bound down by old traditions, habits and customs, however sacred and venerable these may be. In its case, "stone walls do not a prison make, or iron bars a cage." And no better illustration of this was to be found than in the modern history of the great institution of which he now had the honour to speak. Of the increasing vitality of that noble seat of learning he need make no remark to those who, like himself, to-day had an opportunity of wandering through the marvels and wonders of the University museums, class rooms, and workshops. Let him call to mind what the University had done within the last few years and the results. Let him speak of the Professorship of Experimental Science, where master and pupils bared their arms for the work of the forge, the anvil and the bench, and where dynamo-electric engines, park gates, and even the steam boat, had been constructed not only by their own skill, but by their own hands; of the Professorship of Morphology, now graced by one of the distinguished name of Sedgwick, the worthy successor of him who died during the first year of his professorial career, regretted by all who knew him; he referred to Professor Balfour, of Trinity College. Let him speak of the chair of Physiology and Professor Michael Foster; of Pathology filled by Professor Roy, of Edinburgh; and lastly, of the chair of Surgery filled by Professor Humphrey, as a labour of love—one who had never rested till he succeeded in getting his University installed as a school of medicine scarcely second to any in the kingdom. And for the advancement of these great ends let him remind them of the expenditure so willingly contributed—an expenditure which would, 50 years ago, have been set down as lavish or extravagant—since only during the last session the magnificent and liberal sum of £70,000 had been advanced by the Senatus. It was not to be wondered at, then, that with this widened scope of teaching, with the removal of old barriers of exclusiveness, and increased consideration for the student of slender means, the number of University pupils was increasing yearly, and were being sent out as a credit and an ornament to the civilised world, and as adding a lustre to the land in which they lived.

The Rev. Dr. Taylor, Master of St. John's, responded, thanking the assembly for the cordial way in which the toast had been received. Unfortunately, he said, there were only a few members of the University in residence to receive the Association, as was, indeed, to be expected at that time of the year, but he did not hesitate to speak on behalf of them all, and assure the Association of a hearty welcome. The assembly of a congress such as the present one, and other such congresses as were held from time to time in Cambridge, were one of the signs of the age, and it was not without its significance that that town should have been chosen for that distinguished gathering. Their presence there showed their increased interest—he thought he might say the increased interest of the country—in the affairs and working of the University, and he gladly accepted it as a testimony of the fact that the Universities were really striving more and more to do effectually their work in the country. Their presence showed their appreciation of those efforts—it was testimony that they (the Universities) were widening their circle of interest and making their influence felt in every part of the country and in every department of science in the widest sense of the term. Allusion had been made to the changes which had taken place and were taking place. If they were to look into all the departments, and into all the details of these changes, he must say that the result was simply bewildering; but if they took a general view, one thing came out very clearly—namely, that there was pervading the whole of it a spirit of increased activity—a desire to do the work which lay before them more and more effectually in their every department and in their every faculty.

Dr. Bradbury then proposed "Prosperity to the British Dental Association." He gathered that the Association had been modelled after the British Medical Association, and having been rather closely connected with that Association, he felt sure that they could not have selected a better type after which to model their rules and regulations. The British Medical Association had been a very great success, and he felt sure the Dental Association would be an equally great success. He was reminded that the Association already numbered about six hundred qualified dentists, and he felt sure that before long all dentists who were worthy of being members would belong to it. He had never yet attended a meeting of the British Medical Association without coming away a wiser man, and he was sure those who had assembled at that meeting must carry away with them some new wrinkles and ideas. The Association was so flourishing that he felt sure that before long, like the British Medical Association, grants would be given for the encouragement of scientific objects. There were a great many points in Dentistry which he was sure required investigation. If they could see their way in the course of time towards giving grants for the investigation of dental problems, they would feel that they had done a great deal to further the investigation of disease of the teeth. Speaking as a Physician, he could not sufficiently thank the Association for what it had done for the doctors, and he congratulated the members upon the Association's prosperity. He would conclude by coupling with the toast a name that was known wherever Dentistry was practised—that of Mr. John Tomes.

Mr. John Tomes, who was received with loud cheers, said:—Mr. President and gentlemen, you have drunk with great enthusiasm, "Prosperity to the British Dental Association." Well, it is in your hands. You, members of the Association, can secure its prosperity, if you act with unanimity, and in the true spirit of the laws framed to govern the Association. The Association was formed in the first instance to assist in carrying out the spirit and provisions of the new Dentists' Act. That same Dentists' Act was passed for the advantage of the public in the first instance, and for the advantage of dentists in the second; and I believe we can all agree that the bargain was a fair one. It was not in any sense one-sided. Had it been in any sense one-sided in respect to the public, we should have demurred to carry it out; had it been one-sided in respect to ourselves, the public would have rebelled, and we should have had the Act repealed. The manner in which we have sought to carry out our organisation is partly by the formation of Branches in different districts of the country. Each Branch nominates to the executive of the Association—or the Representative Board, as it is called—a certain number of members, and these members are required to attend the meetings of the Board, and discuss questions that affect the general interest of the profession. A Branch determines all strictly local questions, and may discuss amongst themselves questions that affect the general interest of the profession, and may depute their delegates on the Representative Board to convey and advocate whatever opinion they may have formed; but the Branches cannot properly address, except through the Representative Board, any public body interested in and influencing the prosperity of the dental profession. By this means we have up to this time presented one front, one centre, and that the Representative Board. The Government give us a certain amount of credit, and listens to our Council; the medical authorities listen to our requests, and grant them whenever they are reasonable or practicable, or within their power to grant. If one Branch of our Association, on its own responsibility, addressed a medical corporation, or any other public body, that Branch would be utterly at fault—who would know what value to put upon the communication? If one Branch after another did this the Association itself would be very soon discredited. It would no longer present to those in power that one solid front, responsible to the profession, which it now presents; it would no longer have that great influence which the British Dental Association possesses now, as representing with unanimity the views that are regarded as necessary for the public good and for that of the profession. I am anxious that this view should be understood by ourselves and by the public, for I feel that no body of men can so accurately describe what is required for the prosperity of dentists as dentists themselves. No body of men have a better right to say to a Government—"We ask you to grant us this or that privilege, for it will be not only to our advantage, but to the advantage of the public." But, supposing a number of dental bodies—Branches if you like—were separately to address the Government in memorials even to the same end, written in a different spirit—and they would assuredly be so written, for no two people would frame a memorial of the same nature in the same words—I feel it would be a death-blow to the Association. There would be an end to our Society, there would be an end to the good we could do, and there would be an end to the possibility of any public body acting on our behalf. For neither the public nor any public body can unravel for use the relative merits of discordant schemes advanced with seeming authority by the representatives of a common subject. Comparative safety lies in reserving action until an agreement is come to by the discordants—a course adopted by the Government in the treatment of the many Medical Bills brought before Parliament during the last few years. Surely, I am not wrong in urging, in the management of our affairs, the avoidance of this form of folly. The subordination of special to general interests, of selfishness to generosity, will not mar the fair front we present to society. So much for one aspect of the position. The great service we may render in promoting learning in the education of our pupils, and in the encouragement of research, are fully recognised by the Association. We are, however, too young and too poor at present to advance very largely the means for the cultivation of science—all these are questions which, I think, will come up and be satisfactorily met as we become more numerous as a body. At present we number near upon 600 members, while on the Dentists' Register there are 5,000.

Of these a great number, I am sorry to say, are not eligible as candidates for membership, for one condition necessary to joining the British Dental Association is that a man shall conduct his practice according to professional usages. I need not describe to you the usages of professional conduct ; it is common knowledge. There are many things of common knowledge very difficult to define, and really unnecessary to define, for everyone knows what is meant by the term "Professional Usages." Well, gentlemen, I have very little more to say on behalf of this Association, except that its cause might have been better advocated by others more capable of speech than myself; but I will contend for myself that nobody has a greater, a deeper interest, than I have in the Association. No one appreciates more strongly the great use it may be to the public and to our own profession. I cannot see that we could very well do without it. Our future, as practitioners of a branch of surgery, is rightly entrusted in the hands of the Medical Council, the governing body of the medical profession, or if not yet the governing body of the medical profession, I predict that it very soon will become so. Gentlemen, I thank you for the cordial reception that has been given to the toast, and I thank you also for the kind and attentive hearing you have given me, a very poor advocate of this good cause.

Sir Edwin Saunders then rose to propose "Prosperity to the town of Cambridge, and the health of his Worship the Mayor." The President, he said, had stated in his Inaugural Address that everything was in a state of change, and, he hoped, of progress, and it seemed to him (the speaker) that there were certainly three things which the world agreed should be reformed, viz., the three-volume novel, long sermons, and after-dinner speeches ; he would therefore endeavour to discharge his duty in very few words, It had been his privilege last year to propose the toast of "The University of Edinburgh," on the occasion of the magnificent reception accorded to the Association in that beautiful city, and now the responsibility devolved upon him of returning thanks for the kindness and liberality with which the members had been received in this ancient and deeply interesting town of Cambridge—Cambridge, with its learned leisure, with its stately avenues, its sylvan glades, its silent cloisters, its ornate pinnacles and spires, its noble halls, its sacred fanes :—Cambridge, the home of learning, the cradle of oratory, whether for the Bar, the Senate, or the

Church. He gave as the toast, "The town of Cambridge, and the health of his Worship the Mayor."

The Mayor of Cambridge (W. B. Redfarn, Esq.) responded. In the course of his remarks, he said he had a close sympathy with the members of the Association because, like them, he drew ; and, speaking as an artist, that which had interested him most was the collection of pictures, of which he had heard but had not yet been able to visit. He was told that many of them showed great merit. The exhibition showed that dental practitioners did not expend the whole of their energies on their profession, which was, he thought, a healthy sign. In conclusion, he would only, on behalf of his fellow-townsmen, return thanks for the kind way in which the toast had been proposed.

Mr. R. Wentworth White proposed "Prosperity to the Union Society of Cambridge," and, in so doing, acknowledged the kindness of the Society in placing their premises at the disposal of the Association.

Mr. W. Howard Stables responded. The Union Society, he said, was a public body in the sense that it had had among its members men who had taken a prominent part in the public life ot the country. In the Church it had had men who had filled with dignity and eminence the Episcopal Bench, among whom might be mentioned the Archbishop of Dublin and the Bishop of Durham, while in the last and the present Government the members of the front Ministerial Bench were shared by the Society and that of Oxford. With regard to the action of the Union in doing its best to make the Association comfortable, considerations of an obvious character assisted the Society in coming to that conclusion. The Union had felt that no relations but the most cordial ought to subsist between two bodies of men who devoted themselves, with, he trusted, equal pains, to the interests of jaw. The Union Society was cordially thankful that it had been of some assistance to the Association. He was only expressing the feelings of every member of the Society when he bade the Association welcome.

Professor Stack (Dublin) proposed "The Dental Benevolent Fund." That fund, he thought, had very great claims upon the Association, which had before it the example of the British Medical Association Benevolent Fund, which had done an incalculable amount of good. Though the Dental Benevolent Fund had not yet assumed anything like the same proportions, yet he would venture to say that, in comparison with the amount of money which had been subscribed to that fund, an equivalent amount of good had been done by those to whom the distribution of it had been entrusted. The Committee had in that distribution exercised a judicious selection, and no person who had received that charity had been an unworthy object. This year over nineteen heart-rending cases had been assisted at the small average cost of £9 per annum apiece. There were many other deserving cases, but the funds at the disposal of the Committee were not sufficient to allow them to do more than they had done. He coupled with the toast the name of Mr. Oakley Coles, who had worked hard for the fund, and who was the one of all others best qualified to respond for it.

Mr. J. Oakley Coles, in reply, said that the fund was doing its work quietly, and he hoped efficiently, but he was sorry to say that, for want of sufficient means, it was not doing all that it ought to do. He urged all the members to support the fund, observing that he wanted them to give, not because it was the fashion to do so, but because it was a personal duty incumbent upon them. Up to the present time the fund had not helped any members of the Association, but now there were two such cases in which help was required, in both of which men who had been members of the Association had passed away, leaving their widows and children in great distress. He appealed to the members of the Association to try and realise their responsibility in this matter.

Other toasts having been responded to, the meeting separated.

A novel feature in connection with a meeting of Dentists was an exhibition of Pictures and other Works of Art produced by members of the profession. The display showed the existence of considerable versatility of talent and artistic feeling among the exhibitors, and proved that Dentists need not be merely artisans having ability of a limited and special form only. The exhibition was inaugurated by Mr. Oakley Coles, the proceeds of any sale to be given to the Benevolent Fund.

Mr. J. Fenn Cole, L.D.S.Eng., sent three oil paintings, "Derwentwater," "Walton Ferry," and "On the Tamar," which were very creditable amateur works. Mr. Henry Evans, L.D.S.I. showed a crayon of a cast, "Prayer," a plaster medallion of the "Prince Consort," and a sharp, moderately well undercut ivory carving of "Welsh Coat of Arms." Two water-colour drawings, "Old House in St. John's, Maddermarket, Norwich," and "St. Swithin's Church Alley, Norwich," were from the brush of Mr. B. W. Harcourt. Mr. David Hepburn, L.D.S.Eng. contributed five small water-colours, which were much admired. Two subjects in water-colour and four oil paintings were exhibited by Mr. Alfred Prager, L.D.S.I. They were very pleasing and the colouring good, though the latter were more successful than the two water-colour drawings. Mr. Prager has also exhibited at the Guildhall and other galleries. Mr. Chas. S. Tomes, F.R.S., had three sea pictures in oil, and one water-colour drawing, warm in tone—"Rye, Sussex." "Showery Arran" successfully portrayed the wild and rocky coast of Arran, and was exhibited at the Royal Academy last year. Two drawings, "The Pool near Sheire," and "The House on the Marsh," by Mr. Arthur Underwood, M.R.C.S., L.D.S.Eng., were very pleasing, and gave promise of leading up to the success of his father (Mr. Thomas Underwood, L.D.S. Eng.), as was shown in two landscape drawings, also in water-colour.

Mr. G. C. Whyte exhibited two water-colours which were bright in colour, and effective, though somewhat laboured. Two large black and white drawings, by Mr. F. W. Richardson, L.D.S.I., were very good. In the "Haunted House," the light in the foreground of the distant moon might, with advantage, have been subdued even still more than had been accomplished. "On the Shores of Arran," and "The Day is Done," by Mr. J. H. Mummery, M.R.C.S., L.D.S.Eng., are exceedingly good, the latter being a very peaceful scene with considerable depth.

Mr. J. A. Fothergill, M.R.C.S., L.D.S.Eng., and Mr. A. J. Woodhouse, L.D.S.Eng., exhibited some photographs, which showed care taken in the selection of subjects, in focussing and development. Mr. C Sims, L.D.S.Eng., showed several carvings, ornaments, &c. A beautiful plaque of repoussé work, by Mr. W. Lord, assistant to Mr. Coles, was worked with considerable skill; also an oval tray, in copper, by Mr. G. Shrivell, pupil of Mr. Coles, showed taste in the chasing and repoussé work. This youth likewise produced two models of demonology, one being cast in plaster, and the other in metal. Mr. Penfold, L.D.S.I., exhibited an ornamental arrangement for an electric bell; and Mr. Oakley Coles, L.D.S.Eng., a piece of mosaic worked with fragments of waste pottery. Mr. Oakley Coles also showed five tracings of a polyclinic, designed by himself, the structural and architectural details and drawings having been elaborated ten years ago by Mr. W. Murray, A.R.I.B.A., London. The building was to be four stories, circular, and 220 feet in diam., with corridors around an inner well (100 feet in diam.), for light and air. On the exterior there was to be an ambulatorium, within this the wards, and internally the class rooms, &c., for each special group of wards.

In the Biological Laboratory of the University there was a large display of dental instruments and apparatus, by Messrs. Ash and Sons and the Dental Manufacturing Company.

Friday morning was devoted to the demonstrations. Though several gentlemen, who had promised to work, failed to fulfil their engagements, others generously came forward and filled the vacant places. Demonstrations were given by Mr. Balkwill, Plymouth; Mr. J. Andrew, Belfast; Mr. Stour Bennett, Mr. Newland Pedley, Mr. Cook Parson, Clifton; Mr. A. Jones, jun., Cambridge; Dr. Bogue, New York; Mr. Verrier, Weymouth; Mr. Fisher, Dundee; and Dr. C. M. Cunningham, Cambridge.

Numerous models, cases, and pathological specimens were exhibited by several members of the Association.

On Wednesday evening Mr. Alfred Jones, Chairman of the Reception Committee, entertained at dinner at his house a number of the officers and members of the Representation Board. Dr. Cunningham also held an " at home," which was largely attended.

On the Friday afternoon, at 4 o'clock, a garden party was given in the spacious grounds of Downing College by the President of the Association. The band of the First Cambs. Rifle Volunteers played a selection of music. Mr. Blandy, L.D.S.Edin., took same photographic groups, which are understood to have proved successful.

On the Saturday a water party was formed, and an excursion on the Cam at Clayhythe formed another enjoyable event.

THE GLASGOW DENTAL HOSPITAL.

In 1879 a Dental Department was opened in Anderson's College, Glasgow, to provide a Dental School for the west of Scotland. The department has been one of increasing usefulness, and some fifty students have availed themselves of the facilities offered. But the usefulness of the Hospital was necessarily restricted, though there has been a large increase yearly in the number of patients seeking relief. In this year (1885) certain changes in the constitution of Anderson's College were announced, resulting in the separation of the Medical School (and consequently the Dental School) and the raising of Anderson's College into a purely Technical School. This was thought to be a favourable opportunity for placing the Dental Hospital and School on a more favourable footing. The result has been attained in the opening of the premises, 56, George Square, in May last, as a Dental Hospital and School, the former being supported by voluntary contributions and managed by a General Committee. Since the opening of the Hospital in the present premises, the attendance of those seeking relief has largely increased, being on some occasions over forty in one day; and there can be no doubt that as the institution becomes more widely known, the number of patients wlll be immensely increased. The Hospital is open from 5 to 7 p.m. during the first four days of the week, and from 9 to 11 a.m. on Saturdays. The prospectus of the new School has recently been issued, but a copy did not reach us in time for the information to be given in our usual Student's Number on September 1st, notwithstanding the authorities of Anderson's College having been written to in due time. Mr. J. R. Brownlie is the Dean.

MANCHESTER ODONTOLOGICAL SOCIETY.

THE object of this newly-formed Society is the diffusion of knowledge and the promotion of intercourse among Dentists, and such object will be attained, amongst others, by the holding of monthly meetings, at which communications will be made, and objects of interest to the profession exhibited.

The following gentlemen constitute the Council:—President, George W. Smith, M.R.C.S.; Vice-Presidents, J. Hooton, L.D.S., H. Planck, L.D.S.; Secretary, P. Betts, D.D.S.; Treasurer, Parsons Shaw, D.D.S. Other members of Council: L. Dreschfeld L.D.S.; P. Headridge, L.D.S.; J. H. Molloy, L.D.S.; J. Taylor, D.D.S.

The first meeting of this Society was held at the Grand Hotel on September 29th. About twenty members were present, and many interesting microscopical and other specimens were shown.

DR. O. GUERIM'S ARTIFICIAL VELUM PALATE.

This velum is made of thin gold, and its flexibility is delicate and considerable, so that it readily follows the movements of the remnant of the soft palate. The flexibility is obtained by four hinges, which are embedded in the substance of the palate, beginning at the posterior margin of the hard palate. These hinges are so constructed that they do not extend beyond the surfaces of the plate. The elasticity is obtained by the insertion of a very thin, hair-like, metallic spring, which is hidden in the thickness of the velum, and runs through the substance of the four hinges. The spring is just strong enough to cause the velum to follow the movements of the parts without producing undue pressure. There are no pivots, spiral springs, or other mechanism than that mentioned, so that the apparatus will be cleanly.

THE VOLUNTEER MEDICAL STAFF CORPS.

The attention of the junior members of the profession is directed to the existence of the newly organized Volunteer Medical Staff Corps now embodied in London.

This Corps has been raised for the purpose of forming bearer companies and field hospitals, so much needed if the volunteer army is to become really efficient as a defensive body.

Just as the medical students of London have formed companies in the corps, there can be no reason why the junior members of the Dental profession should not have their own company and learn the drill and discipline of the medical soldier.

The corps wears the same uniform as the medical corps of the regular army, and had recently a capital week's drill at Aldershot.

The instruction includes infantry drill, ambulance drill, field hospital administration, and the whole working of the Medical Corps in war. If any gentleman interested in this subject will call at the headquarters office, 26, King William Street, Strand London, he can learn all particulars.

JOURNALISTIC SUMMARY.

THE DENTAL COSMOS. (*October, PHILADELPHIA.*)

"Dental Caries," by A. Morsman, M.D., D.D.S. This article is continued from the previous number, and deals with Predisponents.

Errors of Calcification.—The process of hardening or calcification is similar to ossification of bone in a matrix of cartilage. The hard tissue or lime-salts are not simply deposited in the meshes or fibres of this organic matter. *No union could be more intimate.* Both are changed so as to lose their identity, and are merged into the new substances which we call dentine and enamel. He then gives a description of abnormalities, as pits, fissures, notches, &c., and goes on to deal with their causation.

The writer, in conclusion, states: I have shown that this condition has probably many causes, and that we are not justified in attributing to any one apparent cause all cases alike. Rather we should, by patient search, endeavour to verify our observations. Unfortunately, dentists have done but little of this kind of work. They should do more. The field is a large one, and promises excellent results.

"NERVOUS MATTER AND PRINCIPLES OF NERVOUS ACTION" is the subject of a paper that was read before the Illinois State Dental Society by Dr. Garrett Newkirk.

"THE TREATMENT OF DEEP-SEATED ABSCESSES WITHOUT EXTERNAL INCISION," a paper read before the Minnesota Dental Society, August 1, 1885, by Dr. John S. Marshall. The duration of extreme cases can be materially shortened, and many of them speedily cured, without resort to any other operative procedure than the extraction of the diseased tooth and the injection of peroxide of hydrogen into the sac. Ophthalmologists and aurists have found this agent very useful in the treatment of diseases of the eye and ear, with purulent and muco-purulent discharges, and dentists have been signally successful with it in the treatment of pulp-chambers with putrid contents, in ordinary alveolar abscesses and in pyorrhœa alveolaris. By injecting an abscess of the deep-seated variety with peroxide of hydrogen, introduced through the alveolus of the extracted tooth, the purulent contents can be thoroughly evacuated. The writer then details the treatment of several cases in practice.

"THE TREATMENT OF DENTAL LESIONS BY COMPRESSED WARMED AND DRIED AIR," by Dr. H. C. Register. Warm air has been used to a limited extent in the surface-drying of cavities by means of the hot-air syringe, but compressed warm air has a much wider range of application, and compressed warmed *dried* air has a still greater range. Some of its uses in a general way I will briefly indicate: As an obtundent of sensitive dentine in the preparation of cavities; for the thorough removal of moisture from both vital and devitalized teeth before filling; the antiseptic treatment of devitalized teeth and roots; the thorough drying of roots before attaching artificial crowns, making a hermetically sealed joint; in putrescent conditions of the teeth—especially useful when associated with peridental ulceration; in the bleaching of discoloured teeth; in the treatment of fistulæ and abscesses; in ulcerations of the antrum and nasal passages; in recession of the gums and pyorrhœa alveolaris, &c. By this means the detached gum can be lifted from the tooth by a steady jet of air, allowing an inspection of the parts and the removal of the calculus. By the same apparatus anæsthesia may be produced by atomization, rendering operations on the gums painless. By the same means fillings of the oxychloride or phosphate of zinc can be perfectly crystallized before the fluids of the mouth are allowed to come in contact with them. In bleaching discoloured teeth, the greatest cause of failure, I apprehend, has been the presence of moisture in the dentine, preventing the absorption of the bleaching agent, and which the mere drying out by absorbents, or even with the ordinary hot-air syringe, does not affect. By gently forcing into the cavity an uninterrupted stream of warmed air under pressure, it reaches the terminal ends of the tubili in both crown and root. If the bleaching agent is then introduced it will permeate the organ throughout its extent. I have seen discoloured teeth of many years' standing thus restored to within a few shades of their healthy neighbours in less than thirty minutes.

(Nothing is said of the mode of applying air so compressed warmed, and dried.)

The reports of the proceedings of the American Dental Association of the First District Dental Society (of New York), and of the New Jersey State Dental Society, occupy considerable space.

THE INDEPENDENT PRACTITIONER. *(October, NEW YORK.)*

"MECHANICAL AIDS IN THE TREATMENT OF POCKET DISEASE OF THE ALVEOLUS," by Dr. J. N. Farrar. In order to reach the highest possibilites by any plan of treatment of what is known as "pyorrhœa alveolaris," and what I will here call, without stopping to give reasons, *pocket disease of the alveolus*, as much depends upon the quality of treatment as the kind—upon thoroughness of the mechanical aspect as upon the kind of medicine. This, however, includes a degree of cleanliness that implies proper instruments as well as intelligence. Attention has not been sufficiently directed to the devising of instruments that will permit rapid thoroughness with the least injury to the tissues, and the least pain. Waste of time and needless torture have too often usurped the place of thoroughness, and mere puttering assumed that of careful skill.

In the construction of instruments, proper size is of as much importance as correct form. While variety of shape is essential in order to easily reach a locality, delicacy in structure is necessary to effectiveness, with the least pain and the least injury to the soft tissues. Small and delicate instruments permit the attainment of all that is desired; clumsy ones cannot. Different sizes, although of the same shape, may also be said to be sufficient to constitute practically as great a difference as different forms. Syringes for washing the debris from the pockets should also be constructed with the view to equal thoroughness. Unlike those in present use, which more resemble hypodermic syringes than anything else, holding only a few drops, they should be capable of holding sufficient water to flood out the pockets. A few drops of water will wet, but sufficient quantity is requisite to thorough cleansing.

Although but few properly made instruments for this purpose are to be found in the shops, several operators who have felt the need have devised for their own use several varieties, some of which should be made public for the good of the profession. When a location of the disease was found that could not be easily reached with anything that I had, I selected a rod of soft steel from a lot partially prepared for the purpose, and bent, hammered, filed, and fitted it on the spot, and, after using it for a week or two to see that it was all right, it was tempered for permanent use. In this way a set of about thirty instruments came into existence. While some are more generally useful than others, yet for the purpose intended all are valuable to me, but perhaps a dozen might be selected that would suffice.

After the hard deposits have been detached from the roots, or after cutting loose necrotic tissue (when present), it is necessary, in order to effect the most rapid cure, that the debris be thoroughly washed away, leaving no particles to be "ulcerated out," as is too often the case. This requires water in sufficient quantity to flood out the pockets with a vigorous stream, long-continued, which implies a syringe of considerable size.

After thoroughly washing the pockets with tepid water, and if there is no necrosis, I inject them with equal parts of wood creosote and alcohol from a Farrar Alveolar Abscess Syringe; but if necrotic tissue is present, I use chloride of zinc, just short of escharotic strength.

OBITUARY.

It is with regret that we announce the death of Mr. George Buchanan, of Glasgow, on the 2nd October, at the age of 64 years. He was well known to the passing generation of dental surgeons, and was one of the earliest members of the Odontological Society, having joined it on its formation in 1856. He was a vice-president 1875-77. He was pupil of Mr. Roberts, of Edinburgh, and before commencing practice in Glasgow he was for a time with the late Mr. Arnold Rogers. Mr. Buchanan will also be remembered in connection with the Dental Hospital of London as the donor for many years of the Buchanan Prize. For the last five years his health had been somewhat failing him, and he died, after a very short illness, of congestion of the lungs.

Editorial.

THE BRITISH DENTAL ASSOCIATION.

The amount of space given in this and the preceding number of the Dental Record to the report of the meeting at Cambridge of the British Dental Association, may be taken as an indication of the growing importance, value, and representative character of the Association. This last meeting was another unqualified success. The free use of the well-appointed rooms of the Union Society, the garden party, the reception and conversazione, the dinner, and the general recognition of the Association, were only outward indications of the care, forethought, and labour given to the arrangements by the Reception Committee, and especially by the local secretaries, Dr. G. Cunningham and Mr. Rhodes.

The Secretary's Report will show to outsiders that the Association is of some practical benefit to the profession and to the public ; and the value of such meetings to the individual practitioner, for the promotion of professional intercourse and social advancement, are cogent reasons for a yet greater support being given to the Association. Every Dentist in the United Kingdom who does not belong to the Association is neglecting his own interests, the interests of the profession, and the interests of the public. The Association is unquestionably a powerful means—indeed, the most powerful means that has yet existed—towards the elevation of the profession. The meetings of the Branches and of the parent Society are great educational gatherings. It is by education, in this greater and wider sense, that the advancement of the profession will be attained. It is by education—not merely the ability to work out mathematical problems and logical inductions, or recount historical episodes, but the liberal cultivation of so-called "common-sense," sociality, and intelligence—that the greatest good to the greatest number will be accomplished. The personal advantage to be derived from such meetings was testified by Dr. Bradbury in his speech at the dinner: "He never yet attended a meeting of the British Medical Association without coming away a wiser man." The benefit of the British Dental Association to the public is also asserted by Mr. John Tomes, who, at the same dinner, repeated that the "Dentists' Act was passed for the advantage of the public in the first instance," and this Association has, for its first object, "to carry out the provisions and spirit of the Dentists' Act."

This journal being devoted to the interests of the Profession, there never was a more opportune moment than the present for urging the members of our specialty to take advantage of the means which this Association presents for advancing the interests of themselves, of the Profession, and of the public upon whom they depend.

Mr. Felix Weiss, L.D.S.Eng., was, at the request of many friends and fellow-vestrymen, a candidate for the Finsbury District of the London School Board, but we learn, on going to press, that his candidature was unsuccessful.

GOSSIP.

Monthly Statement of operations performed at the two Dental Hospitals in London and the Dental Hospital of Birmingham, from September 1st to September 30th, 1885:—

		National.	London.	Birmingham
Number of Patients attended		1,735	2,230	970
Extractions	Children under 14	481	456	711
	Adults	656	1,035	
	Under Nitrous Oxide	558	230	23
Gold Stoppings		107	131	4
Other Stoppings		536	648	231
Advice and Scaling		279	144	—
Irregularities of the Teeth		201	85	—
Miscellaneous		228	396	24
Total...		3,046	3,125	993

In a recent number of *Das Wetter* of Magdeburg, there is an abstract of a series of observations on trees injured by lightning, the great majority—165 out of 265—being oaks. It has been suggested that the frequency with which oak trees are struck is due to the presence of iron in the wood.

During the *Challenger* expedition, the trawl, on one occasion, between Tahiti and Valparaiso, brought up, from2,375 fathoms, two bushels of manganese nodules, and amongst these were 1.500 sharks' teeth, and 42 petrous and tympanic bones of whales, belonging, as determined by Prof. Turner, to six different species.

In his opening address in the Section on Anthropology at the meeting of the British Association, the President, Mr. Francis Galton, F.R.S., said:—"The appearance of a new and useful family peculiarity is a boon to breeders, who by a selection in mating, gradually reduce the preponderance of those ancestral elements that endanger reversion. The appearance of a new type is due to causes that lie beyond our reach, so we ought to welcome every useful one as a happy chance, and do our best to domicile and perpetuate it. When heredity shall have become much better and more generally understood than now, I can believe that we shall look upon a neglect to conserve any valuable form of family type as a wrongful waste of opportunity. The appearance of each new natural peculiarity is a faltering step in the upward journey of evolution, over which, in outward appearance, the whole living world is blindly blundering and stumbling, but whose general direction man has the intelligence dimly to discern, and whose progress he has power to facilitate."

THE

DENTAL RECORD.

VOL. V. DECEMBER 1, 1885. No. 12.

REVIEW OF BOOKS.

NOTES ON ANÆSTHETICS. By Arthur S. Underwood, M.R.C.S., L.D.S.Eng. Claudius Ash and Sons.

WE have derived considerable pleasure in the perusal of this little book. Mr. Underwood lays claim to no original work, but frankly acknowledges himself to be a compiler rather than an original author. Indeed, if anyone is to be held responsible for the major part of the statements made, it must be Mr. Braine, who "read, corrected, modified, and endorsed" the manuscript. It is obvious that any observations from the pen of so high an authority cannot fail to be of the greatest value; and, although Mr. Braine has enunciated no new propositions, his remarks, which are the outcome of so large an experience, will always command attention. Although the title of the book might lead us to expect that the three great anæsthetic agents would receive somewhat equal notice, such is by no means the case; for, whilst ether and chloroform are disposed of in two short chapters, the greater familiarity of the writer with nitrous oxide gas is evidenced by the fact that most of the subject matter of the book has reference to this latter anæsthetic agent.

The chapter on nitrous oxide is well worth reading. We cordially agree with Mr. Underwood in enforcing the fact that the supervention of collapse during operations under anæsthetics may be, and frequently is, dependent upon a state of semi-anæsthesia. Again, his forcible remarks upon the dangers incurred by anyone combining the functions of the anæsthetist and the duties of the operator are well worthy of careful consideration. There are, too, some very pertinent remarks with regard to the falling back of the tongue during nitrous oxide narcosis. In his statements concerning stertor, Mr. Underwood refers only to the laryngeal form ; but we are inclined to the belief that, in addition to this variety, the tongue may gravitate towards the back of the pharynx, and so cause stertor, which may or may not be associated with the laryngeal kind. We think that a little more might have been said with reference to the peculiarities manifested by some patients under nitrous oxide ; we feel certain that the writer must have noticed many curious effects from gas during his experience. The dangers which sometimes result (especially in prolonged dental cases) from the accumulation of blood at the back of the fauces might have received fuller notice.

The difficulties which have surrounded enquiries into the physiology of anæsthesia may account for Mr. Underwood's somewhat vague remarks upon the subject. We cannot agree with him in his definition of the word "dyspnœa" in Chapter vii., nor do we think the term "apnœa" should be applied to the respiratory conditions which obtain in the final stages of asphyxia.

In conclusion, we congratulate Mr. Underwood in having brought out a book on anæsthetics which contains much useful information, and which does *not* contain lengthy tables of statistics which are held to be inseparable from the subject on which he writes. To the student in Medical or Dental Schools we can thoroughly recommend this small volume as worthy of study and attention.

FREDERIC HEWITT, M.B.

LABORATORY ACCOUNT BOOK FOR DENTISTRY. By Stephen A. Coxon, Wisbech.

THERE are columns for date and name, also a gold column which shows how much is paid per ounce for the gold, its weight and its cost. Another column shows how many teeth were used, the cost per tooth, and the total cost of teeth. This is considered a special advantage to dentists using teeth on approbation. The vulcanite list can be kept in two ways, either by putting down each consignment as it comes in, or if an average be kept for the quarter, each denture will be, one with another, about 1*s*. The workman's column shows how many hours he was actually employed, also what his time cost you. The column called "Sundries, &c.," is intended to register plaster, gas, and laboratory requirements, beyond those which have special columns. If the book be kept in this way an average may then be made of the daily expenses after the first quarter. By looking at the entire cost list opposite the patient's name, it will be seen how much any individual case has cost. By adding up the entire column it will show the full expenses of the laboratory from any given date.

ELECTRICITY: AND THE ELECTRIC LIGHT: IN REFERENCE TO DENTISTRY AND SURGERY.

By C. J. BOYD WALLIS, L.D.S.Eng., &c.

(Continued from page 426.)

PART XVIII.—MEDICAL-ELECTRICITY.

ELECTRO-PHYSIOLOGY includes the effects produced by an electric current on living organisms or tissues, and the study of the influence of the current on the functions and excitability of those tissues.

When the electrodes of a battery are held in the hands, and a current of electricity is passed through, a violent and sometimes painful shock is felt, and the muscles undergo involuntary contractions; this action is increased by moistening the hands with acidulated water, which increases the conductivity of the skin.

Protoplasm—the physical basis of animal and vegetable life—appears to possess the general property of contracting upon the application of the electric-current. The Amœbæ are amongst the simplest living things known to us; they may be described as animate masses of perfectly transparent structureless matter, yet if a current of electricity be passed through such a simple form of protoplasm it immediately withdraws its processes, its changes of form cease, and it contracts into a globular form; but upon the withdrawal of the current it quickly resumes its activity. Similar effects are produced in the protoplasm of young vegetable cells. Ritter discovered that the sensitive plant shuts up when electrified, and Prof. Burdon Sanderson has proved the extension of this property to other vegetables, and exhibited it in the *carnivorous plant*, the Dionœa or Venus' Fly Trap.

If the fresh muscle of a frog be introduced into a galvanic circuit and the current be very rapidly interrupted, the muscle will be thrown into a state of uninterrupted contraction, or physiological tetanus; and, owing to the rapidity of the interruptions, each fresh contraction occurs before the previous one has passed off. The same results follow careful experiment with warm-blooded animals; these phenomena disappear with the life of the muscle, hence, the vitality of the muscles of the latter being maintained with greater difficulty, these experiments are more difficult than with cold-blooded animals. Cunœus discovered the shock of the Leyden jar in 1745, and many interesting experiments followed his discovery. Louis XV. of France caused an electric shock from a battery of Leyden jars to be administered to 700 Carthusian monks joined hand in hand, and the effect was startling. Small animals may be readily killed by means of the Leyden jar; Franklin killed a turkey by a shock derived from this source. The effect of the electric current upon a living nerve is to throw it into a state of activity, whatever its special function may be. Thus, in 1752, Sulzer found that by applying a piece of lead and silver to the tongue, and joining them together, a certain taste, resembling green vitriol, was the result, while each metal apart produced no such sensation. This *galvanic taste* may be produced by placing two wires from the poles of a voltaic cell in contact with the tongue. Du Bois Reymond states that the nerves of motion are affected only by changes in the electric tension of the current, whereas the nerves of sensation, so far as they are affected, are affected not only by these, but also by the steady continuance of the current, and that the excitation of the nerves dependent on the changes of tension increases with their frequency and suddenness. Frictional electricity, in this way, owes its superior physiological power to the instantaneous nature of its discharges. Currents of great tension alone can be felt by the living subject. A battery of 50 cells, capable of giving a brilliant electric light, for instance, would cause no inconvenience to the living subject placed in circuit. The nerves of the palate and of sight can be affected by a very feeble current; and those of hearing by a battery of about 30 cells. Ritter discovered that a feeble current transmitted through the eyeball produced the sensation as of a bright flash of light, by its sudden stimulation of the optic nerve. Helmholtz and Dr. Hunter experienced similar results. Volta and Ritter heard musical sounds when a current was passed through the ears; and Humboldt found the sensation of smell influenced by a current passed from the nostril to the soft palate.

The effect of a feeble current on cold-blooded creatures may be shown by causing a common garden snail to crawl over a piece of zinc and copper; directly it comes in contact with the two metals, it will suddenly pull in its horns and contract its body.

ELECTROTONUS.—Certain parts of the surface of a living nerve are electropositive to certain other parts. The alteration of its natural electromotive condition, produced through the whole of a nerve by the passage of a current through part of it, evidences a change in the whole length of the nerve; this change is called *electrotonus*, or the *electrotonic state;* it is most intense near the extraneous, or *exciting current*, and is attended with important changes in the excitability of the nerve. The part of the nerve through which the exciting current is passing has been named by Pflüger the *interpolar region;* the condition of the nerve close to the positive pole (the anode) is diminished as regards its irritability to stimuli, and its conductivity for impressions, and this part of the nerve is said to be in a condition of *anelectrotonus*. That part of the nerve near the negative pole (the cathode) has its irritability and conductivity increased, and this part is said to be in a state of *cathelectrotonus*.

In the piece of nerve included by the exciting current, there is a *neutral spot* where anelectrotonus ends and cathelectrotonus begins, and the position of this neutral spot varies between the two poles according to the strength of the current employed. As the current applied gets stronger, the maximum amount of anelectrotonus is reached; the nerve then will no longer convey stimuli, and is said to be in a state of *inhibition*. With a weak or moderate exciting current the power of the nerve to conduct stimuli is lowered in the anelectrotonic region, and increased in the cathelectrotonic; with strong currents it is diminished in both. It is important that these facts should be borne in mind in the scientific application of electricity to medical purposes.

Dr. Onimus, of Paris, writing in 1874, "On the different actions of induced and constant currents on the economy," says that "all organic tissues, whatever they may be, give rise to an electric current which depends upon the difference in oxidation of the two points connected by the galvanometer; and electrolytic phenomena always occur through the passage of a current, however short and weak it may be; on the other hand, derived currents are formed on every passage of a current, and immediately after the rupture of the current there occur currents of polarisation whose action, often very energetic, is the cause of the phenomena observed."

Galvanic currents have a more extensive and deeper action than induced currents, although their tension is less. If platinum needles are inserted into the fore-arm, with the needle of the galvanometer at zero, distinct deviation will be noticed on the passage of a constant current through the upper part of the neck, or opposite shoulder, thus proving the diffusion of electric currents, and showing that in organic tissues the influence of a galvanic current extends beyond the immediate radius of the two electrodes in all directions.

A muscle may be tetanised—that is, tetanic contraction of it produced—by passing continuously through a nerve in connection with it a constant weak current, and thereby the excitability of the whole nerve is strengthened; a momentary negative modification occurring in the cathelectrotonic portion of it, which gives place to an enduring positive modification; and a positive modification takes place at once in the anelectrotonic portion.

The physiological action upon nerve and muscle of the induced current is chiefly that of an exciter; it causes redness of the skin, a sensation of pricking or smarting, and erection of the papillæ. Duchenne says that the difference in the physiological effects of the current of the primary and secondary coil is not merely one of degree, and is not simply due to the difference in the tensions of the currents of the two coils; but some physicians are opposed to him in this opinion. He says that the current of the primary coil, or extra current, excites more actively the sensibility of certain subcutaneous muscles, such as the deltoid and supinator longus, and certain organs, such as the rectum, bladder, testicle, and spermatic cord. The current of the secondary coil acts more powerfully, on account of its greater tension, upon organs deeply placed, such as deep layers of muscles; and it is said to affect more acutely the sensibility of the skin and the retina.

C. B. Radcliffe, F.R.C.P., in his work on "The Dynamics of Nerve and Muscle," says:—

"There is reason to believe that all kinds of electricity act upon nerve and muscle by way of charge and discharge, the *charge* antagonising, the *discharge* permitting, the state of action; that the blood acts upon nerve and muscle, not by causing the state of action, but by antagonising it; that 'nervous influence' acts upon nerve and muscle, not by causing the state of action, but by antagonising it."

He goes on to say, "It would seem, indeed—

"1. That the sheaths of the fibres in nerve and muscle are capable of being charged like Leyden jars, and that during the *state of rest* they are so charged.

"2. That the sheaths of the fibres in muscles are highly elastic.

"3. That the fibres of muscle are elongated during the state of rest by the charge with which their sheaths are charged, the mutual attraction of the two opposite electricities, disposed Leyden jar-wise, upon the two surfaces of the sheaths, compressing the elastic substances of the sheaths, and so causing elongation of the fibre in proportion to the amount of the charge.

"4. That the muscular fibres contract when the state of rest changes for that of action, because the charge which caused the state of elongation during rest is then discharged, and because this discharge leaves the fibres free to return, by virtue of their elasticity simply, from the state of elongation in which they had been previously kept by the charge, and that the degree of contraction is proportional to the degree of elongation previously existing.

"5. That the fibres of nerve are not affected in the same way as the fibres of muscle, by the charge and discharge of electricity, because the sheaths of the fibres may be wanting in the requisite degree of elasticity.

"6. That the blood antagonises the state of action in nerve and muscle, by helping to keep up the natural electrical charge which antagonises action.

"7. That 'nervous influence' antagonises the state of action in nerve and muscle, by helping to keep up the natural electrical charge which antagonises action."

ELECTRICITY IN ITS RELATION TO VITAL POWER.—Without discussing the biological theories involved in the assertion, we may, for our present purpose, speak of vital force as the equivalent of nerve force; if, then, we deem them identical, a question of importance in its bearing upon the electrical treatment of disease naturally arises, that is, what relation, if any, exists between electricity and nerve force? The electrical conditions of the atmosphere are continually changing, and if electricity is allied to our own vital force, it is natural to conclude that these fluctuations must have an important influence upon the well-being of all animal life.

The action of the incandescent lamp was explained by analogy (*vide* June No., page 256), in which the electric current was likened to a fluid running through a tube or conductor from one place to another. A similar analogy may be applied to the action of nerve force. Nerve force originates only in the nerve cells, which are in certain places grouped into masses called ganglia. These are of a grey colour, and are called the grey matter of the nervous system, and the slender filaments, commonly known as nerves, are white. These slender filaments, like the wires of the telegraph, originate nothing in themselves, but act simply as conductors. Here is an analogy between nerve force and electricity ; the nerve cell is the battery, and the filament or nerve is the conductor—the wire.

Another analogy exists when electricity is directly applied to a nerve, and similar movements are effected, as when its force is increased by the will. For instance, my mind wills that my knee shall bend ; the brain cell sends this message by means of the nerve to the associated muscles, and my knee bends. On the other hand, if I apply an electric current, by means of a battery, to the same nerve, my knee at once bends, and without my will, or even in opposition to it, if the current be powerful. It would appear from this that the same force is sent from the brain as from the battery, and the identity of the two forces is apparently proved by the fact that if the battery force is increased so as to overpower the other force, the knee is bent in spite of the opposition of the will.

Again, it has been found that the direct application of the electric current to the sympathetic nerve increases the power of action of the part to which it is applied ; and that whatever tends to exalt the nerve force produces the same result, thus showing another similarity between nerve force and electricity.

ANIMAL ELECTRICITY.—MUSCULAR CONTRACTIONS.—The existence of electrical currents in living muscle was first indicated by Swammerdam, in 1678, who proved to the Grand Duke of Tuscany that when a portion of muscle of a frog's leg, hanging by a thread of nerve bound with silver wire, was held over a copper rod, so that both nerve and wire touched the copper, the muscle immediately contracted. About a century later Galvani, unaware of Swammerdam's experiment, discovered, in 1786, the fact that when nerve and muscle touch two dissimilar metals in contact with one another, a contraction of the muscle takes place. Aldini, Nobili, Matteucci, Humboldt, Zanotti, and others; and in later years, Du Bois Reymond, and Dr. Ure, of Glasgow, have shown that electric currents do exist in living muscles and nerves. Fig. 84 shows the limbs of the frog prepared as for the experiment on Galvani's method. The animal is killed and the hind limbs detached and skinned, the crural nerves and their attachments to the lumbar vertebræ remaining. One end of a metal conductor—a zinc wire Z (see Fig. 84)—is introduced between the nerves and the vertebral column, and one end of a copper wire rests on the muscles of the thighs or legs. Each time the opposite ends of the wires are made to join the limbs are convulsed, and the contraction of the muscle throws the legs out to the position C. The frog's limbs thus prepared form a galvanoscope of excessive sensibility, which surpasses the finest galvanometer in delicacy of indication, and by which the excessively delicate induction currents of the telephone can be shown. Galvani proved that similar effects may be produced with other animals. Aldini found that spasmodic muscular contractions could be thus produced in newly-killed sheep, oxen, and rabbits, &c. Humboldt proved the same on fishes. Dr. Ure experimented on the bodies of executed criminals with a success terrible to witness; and produced horrible contortions of the facial muscles, while the chest heaved with the contraction of the diaphragm. These experiments suggested the employment of electricity in the treatment or reviving of persons who have been drowned, the heaving of the chest under electro-muscular action serving to start respiration into activity. The small muscles attached to the roots of the hair of the head are very sensitive to electrical influences.

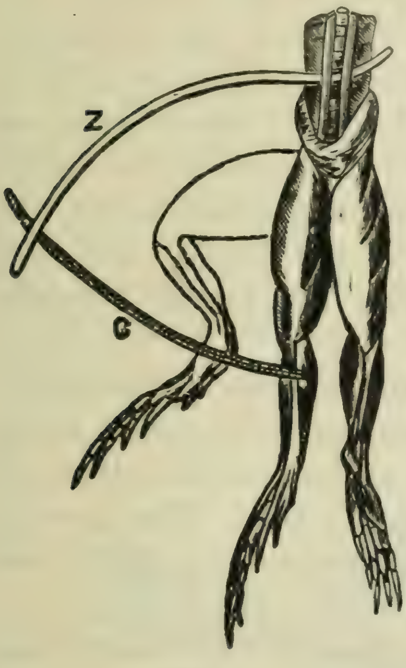

Fig. 84.

Conditions of Muscular Contractions.—Muscle consists of a bundle of fibres having a generally parallel direction, and are attached at their extremities to a tendinous structure; this tendinous portion has been called its *natural transverse section;* the surface of the muscle has been called the *natural longitudinal section ;* and the surfaces obtained by cutting the muscle longitudinally or transversely are called respectively the *artificial longitudinal* and *artificial transverse sections.*

The surface of the muscle is positive with respect to its tendinous portion. By varying the position of the electrodes, and making various artificial sections, it is found—1. That any longitudinal section is positive to any transverse. 2. That any point of a longitudinal section nearer the middle of the muscle is positive to any other point of the same section farther from the centre. 3. In any artificial transverse section any point nearer the periphery is positive to the one nearer the centre. Du Bois Reymond says that during contraction the natural muscular current is *diminished* or *disappears.*

Comparatively little is known of the conditions of conductivity of the matter of the nerves; but experiment shows they conduct better than muscular tissue, cartilage, or bone; and the blood, of all substances in the body, conducts the best. The blood is probably electrolysed by powerful currents which coagulate it and the albumen it contains.

ELECTRICITY IN THE HUMAN BODY.—Electric currents have been detected upon different secreting surfaces and glands of the human body. The development of electricity in the human body must be very great, but its equilibrium is maintained by the quantity of water in the tissues, and to the absence of arrangement for insulation. The free electricity, positive or negative, which may accumulate at the surface of the body is, in a moist atmosphere, at once conducted away.

The reader may have noticed during dry cold weather the crackling noise, sometimes accompanied by sparks, on removing a flannel vest from the skin, or during the act of pulling off silk stockings, which are insulators, or upon combing the hair. A well-marked manifestation of these phenomena occurs in the writer's own person during favourable weather. It is worthy of remark, that scarcely any two persons are in the same condition electrically; nervous and irritable people usually exhibit a more active electrical condition than persons of a phlegmatic temperament. The late Dr. Carpenter has recorded the case of a lady who developed, under favourable circumstances, this electrical condition, and when she was imperfectly insulated, sparks passed from her person to any conducting object she approached; and under very favourable circumstances four sparks per minute would pass from her finger to the brass ball of a stove at 1½-inch distant.

ELECTRICAL FISHES.—Probably the most remarkable manifestations of electricity occurring in the animal kingdom is in electrical fishes, which have the power of giving, when touched, shocks resembling those from a Leyden jar. There are several varieties of these fish, the best known of which are the *Torpedo*, the *Gymnotus*, and the *Silurus*.

The raid torpedo,* or electric ray, of which there are three species inhabiting the Mediterranean and Atlantic, one species is found on the Atlantic coast of America, and another on the California side. The "battery," by which they are able to give very powerful and even dangerous shocks, is quite similar in structure in all the species, and is situated well forward on each side, as shown in Fig. 85. This organ consists of laminæ, composed of polygonal cells to the number of 800 or 1,000, or more; it is supplied with an exceedingly rich distribution of branches from the trigeminal nerve and the pneumogastric. These are ramified upon each cell of the "battery," and give to it its energy. They arise from a special nervous ganglion called the *electric lobe* connected with the medulla oblongata, behind the cerebellum. Each of the cells is filled with a clear fluid, of which one-tenth part is albumen, with traces of common salt. The electric discharge is obtained by touching the upper and under surfaces of the fish. The back or upper surface of the fish is positive, and the under surface negative. The energy of the discharge varies with the size and strength of the fish. The shock serves both as a means

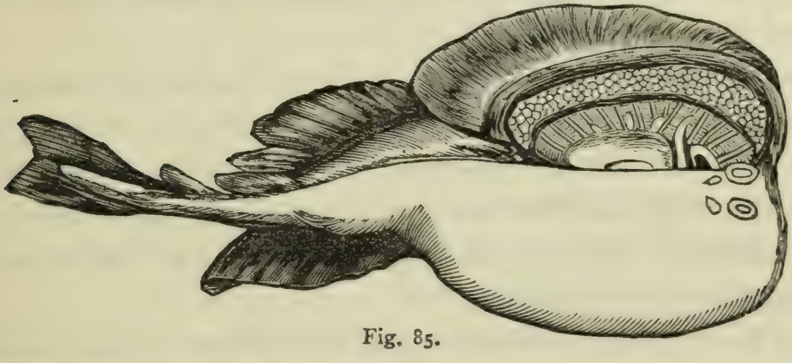

Fig. 85.

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* It is a curious point, says Thompson, that the Arabian name for the torpedo, *ra-ad*, signifies *lightning*. This is perhaps not so curious as that the *Electra* of the Homeric legends should possess certain qualities that would tend to suggest that she is a personification of the *lightning*. The resemblance between the names *electra* and *electron* (amber) cannot be accidental.

of offence and of defence, and is purely voluntary; it becomes gradually weaker as it is repeated and as the fish loses its vitality, for the electrical discharge soon exhausts them considerably, and even causes their death. In the silurus, as in the torpedo, the head appears to be the seat of the electricity. In the *Gmynotus Electricus*, or Surinam eel, the electric organ goes the whole length of the body along both sides. This fish attains a length of from five to six feet, and when full grown is capable of giving a terrible shock. Humboldt, when in the Rio Colorado, measured some of these fish that were nearly six feet in length, and he was told by the Indians that there were larger. Humboldt has described the combats which took place between the gymnotus and wild horses driven by the natives into the swamps inhabited by these fish.

The power of giving a shock is suspended in these fish at a temperature of 32° Fahr., but is again restored at a temperature of from 58° to 68°; and rapid and strong discharges take place at 86°, and the fish then dies.

Reference has already been made to the identity of character between nerve force and electrical force. Dr. Poore is of opinion "that the two forces are related in so far that the one most readily excites the other, and that they are very closely correlated there is every reason to believe, but that they are not identical the following reflections seem to show":—

1. "The rapidity of the transmission differs—that of electricity being estimated at 462,000,000 feet per second, and that of nerve force at only about 200 feet per second."

2. "Nerve force is not conductible along a metallic wire."

3. "Cold diminishes the conducting power of nerves for nerve force, whereas it increases the conducting power of solids or fluids for electricity."

4. "The crushing or compression of a nerve destroys its conductivity. It may be, however, that the crushing of a nerve is analogous to the breaking of the copper conductor in an insulated telegraph wire."

The nature of the power referred to in electrical fishes has often been tested, and it has been found capable of doing whatever electricity, produced from an ordinary battery, can do in the laboratory. Davy succeeded in decomposing iodide of potassium by the discharge of electric fishes, and ascertained the separation of the iodine through the blue colouration that was assumed by starch mixed with a solution of the salt. Davy also succeeded in electrolizing water by means of these fish, and the results of his experiments were confirmed by Faraday. Sparks have also been obtained through the discharge from electric fishes, but with difficulty, says Reymond, owing to the weakening of the currents produced in a general way in all animal electromotors through induction. However, both Matteucci and Du Bois Reymond succeeded in obtaining a spark at the moment of the discharge from a torpedo. Faraday, who experimented with a Harris electrometer upon a gymnotus that had reached London in a living state, found that the discharge from the fish was equal to that of a battery of fifteen jars of a coated superficies of 3,500 square inches. Davy and Faraday both established the fact that the discharge produced by electric fishes is capable of magnetising a steel needle. In 1827 Blainville, Florian de Bellevue at Rochelle, Davy, and still later Professor Robin, experimenting upon the torpedo, ray, &c., have proved the action of the discharge upon the magnetic needle. Prof. Robin used a sensitive galvanometer, and placing the platinum termination of the rheophores upon the electric organ of one of these fishes, obtained considerable deflection of the needle. I have mentioned these experiments because they have definitely established the fact of the production of electricity by the ray and other electric fishes, although the failure in the attempts of some other experimenters led them to the conclusion that the organs of these fishes were only pseudo-electric ones.

Although the nature of this power has been frequently tested, there are no means that I am aware of by which this nerve force may be distinguished from the electricity of the galvanic battery, they are apparently identical, and yet we know that this power of the ray and torpedo is vital—it is nerve power.

Why this function should pertain to the trigeminal nerve and the pneumogastric in the torpedo, while in other fishes those nerves are not the agents, it is difficult to say. In the gymnotus the "battery" is similar in its structure to that of the torpedo—it is situated on both sides of the fish, and goes the whole length of the body; but the nerve supply comes from branches of the spinal nerves, while the trigeminal and pneumogastric are not called into play at all, yet the electrical power is the same.

It would appear, then, from this, that electrical and nerve force are identical. But there are some discrepancies which should be noticed. Electricity when once produced is retained with difficulty, and it is only imperfectly held with the most careful insulation, in a dry atmosphere, while nerve force, on the contrary, originates in the moist tissues, passing freely among them without any disposition to escape from its moist conductors—the nerves. But this does not disprove identity any more than the crushing of a nerve, which destroys its conductivity, and which may be analogous to the fracture of a copper conductor in a telegraph wire, does not disprove identity. Nerve force may be one feature of several types of electrical energy; different nerves are themselves apparently identical in structure, yet convey force to totally different types of organs, giving rise to the sense of sight, taste, feeling, hearing, &c.

THE HOPES AND FEARS OF DENTISTRY.

(*A Paper read at the Annual General Meeting of the British Dental Association at Cambridge on August 27th, and reprinted from the "Journal" of the Association.*)

By Oakley Coles, L.D.S.Eng.

If any large body of men be carefully observed, it will be found that they like to generalise their duties and individualise their benefits.

We have had a good many in the history of the past thirty years who have talked and written freely of the advance and reform of the profession, but whose personal efforts have been chiefly directed to taking advantage of the reforms that have been talked of and that *seem* to some people to have come about by themselves. No progress, no reform, has ever come about by itself. Nay, it has not even come about by the efforts simply of a committee, it has always been the direct product of the individual, acting either alone or in concert with his fellow-men.

Crowds without leaders are merely destructive machines made up of dissatisfied human energies. Three men impressed with a strong individuality will do more than three thousand who have no consciousness beyond a restless discontent, and no ambition beyond a self-contained and selfish apathy. A mass of men who have each a definite purpose at heart will attain their object, but a mass of men who will not think for themselves nor act for themselves, either alone or with others, can attain nothing more certain than movement without progress, change without reform.

Let us recognise the fact with perfect clearness and frankness, that there is no such thing as abstract obligation—all obligation, whatever its nature may be, is distinctly and directly personal and individual. The work that needs doing may be for the sake of others or for our own sakes ; all that need be insisted upon is that each member of the profession must take his own share and part in that work. These points need reiteration at the present time, when those who are now young are reaping the advantages secured for them by those who were young and self-denying some thirty years ago. Communities have short memories, as republics have scant gratitude for those who have served them. We need to keep up the spirit of self-sacrifice, if only that we may hold in faithful recollection the earnest workers of the past. For men of kindred spirit will ever be in touch and sympathy with those who held no service dearly bought that helped their fellow-men.

Those who have been in the habit of asking others to work have often been met with the answer that there is no unwillingness to help, but the difficulty is to know what to do. May I be allowed to try and solve this problem by indicating a few of the things that still need doing, although some may consider that enough has already been accomplished. All " the hopes and fears of the profession " are bound up in the work and the workers of the present day ; we are writing our own history, whether we know it or not, and what the future of the body of dental surgeons may be, depends not on outside influence or circumstance, but upon ourselves, and upon ourselves as individuals, and not merely in a collective capacity.

Commencing with the work that comes nearest to those practising in our great industrial centres, it may be pointed out that we need more precise information than we have at present as to the state of the teeth and gums amongst the workers in copper. It is beyond doubt that the salts of copper, locally applied, have a definite influence on dental tissues ; what we want to know is whether such influence, operating through the system, becomes either curative or porphylactic in regard to dental disease. Again, with regard to the influence of mercury, we need accurate records of the variation in the character of the oral mucous membrane and secretions amongst those who are daily subjected to the influence of mercury in any form. Whether, as in the case of phosphorus, it is essential that there should be a solution of continuity of structure before the toxic effects of mercury become manifested, is, I believe, still an open question. We know, on the other hand, that salivation by inunction depends for its success to a great extent upon the vigour with which the ointment is applied to the skin.

It would be interesting to learn, also, the influence upon the teeth of working in the great acid manufactories of the Northern and Midland Counties.

We should also be informed as to the scientific explanation of the prevalence of decay in the teeth of those who are employed in our great cotton and wool spinning establishments in the north. Is the decay a cause or an effect of dyspepsia ? is the decay or the dyspepsia a direct or a side product of the industry ?

Is there any correlation between the condition of the teeth amongst the dwellers in the apple growing districts of Devonshire and the vine growing districts of Burgundy ?

Is the neuralgia of the Fens caused by dental irritation, or merely coincident with dental lesions ; and is the neuralgia of visitors to a fen country identical in focus and area of distribution with that which is found amongst the dwellers in a miasmatic district ?

These are questions that may best be answered by the observant dental surgeon, and if we can but collect facts and then compare them before coming to a conclusion, we shall see how much one man's work will increase the value and importance of another's observations.

It may be urged that the information to be gained on the subjects indicated would be so slight that its publication would serve but a small purpose. That is a mistake. The Journal of the Association offers facilities for the publication of the briefest possible statements, and as a matter of experience it is found that the short paragraphs generally attract the most readers. Nor must it be thought that because these subjects have already been treated of that they are exhausted. It is not so, for year by year we have been gaining knowledge in the actual methods of research, and perfecting the appliances for carrying out our improved methods. Nor should it be forgotten that the conditions to be examined change in their character with each generation.

There is a peculiar condition of the teeth to be found sometimes in connection with port wine stain of the cheek that needs investigation. I am not aware that attention has ever been drawn to the subject either in the general or special text-books of pathology and surgery. The congenital varicosity of the minute vessels that gives rise to the venous or arterial " port wine stain," if it occurs on the cheek externally, will also be found in some cases on the mucous membrane covering a corresponding area, and certainly in three well-marked instances that I have had ample opportunity of examining, the molars and bicuspids were also discoloured to a marked degree. They presented a dull leaden appearance, with patches of dirty yellow, the opacity was much greater than in any other teeth in the mouth, and the abnormal dental condition was confined to the bicuspids and molars of the upper jaw; there was no apparent defect in form or structure, but simply a change due to some cause operating during the period of the greatest vascularity of the organ. The observation of three cases is of no value excepting as an indication of what to look for, so that the facts may be either confirmed or their singularity proved, and, further, that the accuracy of the observation having been established by a number of instances, some use may be made of this congenital pathological state to elucidate the various points connected with tooth development and growth.

Some years ago I brought before the Odontological Society of Great Britain a case of round-celled sarcoma attached to a lower molar tooth, the tumour being about the size of a split pea. The microscopic examination was made by my friend Dr. Klein, and its structure clearly established. In the discussion that followed, Mr. Alfred Coleman said that he believed these sarcomatous tumours attached to teeth were very common, and recent observations have tended to prove the same fact. The point of interest for dental and general surgeons is, under what conditions do these frequently-occurring sarcomatous tumours become a source of serious trouble. Why do they grow in some cases and remain small and inert in others? This is a question of great interest, and one that needs careful observation and good work to clear up satisfactorily.

Is it not possible that the dental surgeon may be able to help to determine the relationship and distinctions between gout and rheumatism?

The form and character of the true gouty tooth is now fairly well known. Is there either a positive or a negative chain of evidence by which we may differentiate between the teeth and oral secretions of the hereditary gouty subject and the hereditary rheumatic patient? Does decay occur in the same position in both cases? Is the tooth structure varied or identical? Is it or is it not a fact that in gouty patients we get a reverse condition, as to material and structure, to that which obtains in the true rheumatic subject? On this subject well-directed research may afford most valuable aid to the physician, and render the treatment of gout and rheumatism less empirical than it is at present.

As a cognate subject we want to know the exact influence upon teeth, of the altered secretions that are found in the course of certain of the fevers, notably—typhoid in England, and some of the fevers of India. In this respect our work should lie in the direction of discovering the best prophylactic treatment, since that alone remains under control. The fever must run its course, but there is no reason why every precaution should not be taken to limit the extent of its injurious influence. If it could be clearly shown that much of the mischief is preventible, we may be well assured that the physician would gladly adopt such measures as the dental surgeon could suggest in order to preserve to the patient such important organs as the teeth. This is work that can only be carried out at the bedside of the patient, but it is so important that it should certainly be done. At the same time it should be possible to ascertain whether with increase of temperature there is a co-incident alteration in the character of the oral secretions—and, still further, whether this alteration is identical in the parotid, sub-lingual and sub-maxillary glands.

Passing to a problem of deeper interest, though of a purely scientific character, we need some explanation of the cause of the eruption of the teeth. Why are they erupted at all? Why are they only erupted to the extent of the enamel crown? Why do they, as a rule, erupt in a given direction? Is the explanation to be found in the method of formation of the tooth? Is there a tendency of the inflected epithelium forming the enamel organ to return to the position from whence it came? and is this view strengthened or weakened by comparison with the development of the eye-ball; the lens and conjunctiva corresponding in its growth from the epiblast, to the epithelial involution that forms the enamel organ, and the optic vesicle with its progressive changes of form, corresponding with the dental follicle? Will imperfect involution or folliculation give us a clue to the origin of odontomes, and why some are erupted and others remain in the jaw? It is certain that there is not a period merely in which tooth eruption is only possible, but that the motive, force, and direction of eruption remains throughout life, and is only interrupted by opposing influences, without the faculty of eruption being lost.

As intimately connected with the same subject, we may hope to find some means of checking the tendency of the teeth in early middle life to protrude from their sockets. The post-mortem examination of such cases may throw light upon this subject, which requires careful investigation, for there seems to be an appreciable increase in the frequency of their occurrence. It has often been asserted that the training of the dental surgeon is equal to that of the general practitioner of medicine in all essentials, whilst the special training that the dental student undergoes is altogether additional. It would be satisfactory to see this statement confirmed, not merely by frequent reiteration, but by actual work done in the domain of general medical science. The leisure and culture that are within the reach of the dentist of the present day certainly makes such a thing possible; willingness and self-sacrifice alone are wanting for its accomplishment. If it be asked in what direction such work may be found, I would venture to suggest, on the authority of the late Erasmus Wilson, that the general descriptive anatomy of the brain might, with advantage to science, be almost entirely re-written. I do not refer to the microscopical anatomy, as that is the product of quite recent times, but the terms and general description might, with advantage, it has been thought, be reduced to a more scientific standard. We already have two hemispheres with a longitudinal sinus. Why should not the idea of geographical division be still further carried out, and the whole brain divided into degrees and minutes of latitude and longitude? Certain fixed points would mark off the degrees, and by such a method the exact location of any pathological change could be mapped out. The present names might still be used as landmarks, but nothing more. I put forward this suggestion with all submission to the opinion of advanced anatomists; my chief point being that if such work is necessary and feasible it might well be carried out by a member of the dental profession.

One other item in the direction of scientific labour and I have done, not for lack of materials, but for lack of time.

In the treatment of congenital cleft palate by the Süersen method, we have a means of proving to demonstration that the growth of the upper jaw is brought about by the pushing forward of the anterior part of the maxilla on a horizontal plane. When the second molars are erupted, and we may take the dental region as relatively fixed in form, it is quite possible to measure off exactly the extent to which the jaw is carried forward, by noting the constant increase in length required for the obturator, in order that its distal surface may be kept in contact with the posterior wall of the pharynx. This does not occur to the same extent when fissure through the alveoli and lip is present, as in simple fissure of the hard and soft palate, for the reason (as I think) that the body of the sphenoid acting through the vomer is materially interfered with. All this, however, needs accumulated evidence before we can come to conclusions of any scientific value. If amongst the subjects that have been suggested for investigation there be not sufficient variety, then I would urge an examination of the new " Index to the Nomenclature of Disease," recently issued by the Royal College of Physicians. There, at any rate, will be found " infinite variety."

But our work is not limited merely to scientific questions and their solution. " The hopes and fears " of our profession are bound up with the success or failure of the British Dental Association, and what are we to think when, after nearly six years we can only claim 560 men as members out of a possible 2,000 ?

Association means a recognition of the necessity for interdependence, and willingness to sacrifice the personal for the common good. Are we to assume that the society meeting here to-day has not fulfilled these conditions ? Such a conclusion would be most unjust. Speaking from the very centre of those who have been its founders and workers from the beginning, I can state in the most positive and emphatic terms that their one guiding principle has been to secure the greatest good to the greatest number. The profession at large will never know, even, if in part it cares to remember, how much it owes to the labours of such men as John Tomes, Smith Turner, James Parkinson, W. H. Waite, and a score of others, who have never counted the cost or hesitated at any sacrifice that seemed essential to secure the success of the Association. And what have the thousands of outsiders done up to the present time? Why, simply stood aside and grumbled. And what has come of the grumbling? Precisely that which we might have expected—nothing, and I don't know that anything else ever did come of grumbling. The world is not made better by saying it is bad, and this little world of ours, with all its hopes and fears and discontent and petty jealousies, must be made better by work and self-denial, and not by standing aside and letting things drift, or by assuming pre-eminence in the art of saying how things should *not* be done. If it enters into the heart of any man in the profession to do a good thing, let him come forward and do it, instead of waiting for someone else to do it. This perpetual waiting for others to do that which we might do ourselves is one of the greatest difficulties that as an Association we have to contend with. Actions are neither initiated nor completed without the exercise of the individual will, and they are rarely perfect without the influence of the individual conscience.

> "That man seeks a little thing to do,
> Sees it and does it:
> This man, with a high thing to pursue,
> Dies ere he knows it."

When Robert Browning wrote those lines he must have been thinking a good deal of the unpopularity of unattractive yet essential duties. But now let me ask you if the professional man is wise in limiting his work and interests to his own speciality. My own belief is that such a policy is a most unwise one. If to grow rich be all the aim, then let him do one thing only, better and quicker than other men, and he shall die a rich man—living as a well-nourished creature withal. "But is there nothing more? In due time, let him critically learn how he lives, and the more he gets to know of his own life's adaptabilities, the more joy-giving will his life become." No training can be true culture that does not throughout life broaden our sympathies, increase our knowledge, and proportionately enlarge our capabilities. And if I be asked whether all this be compatible with the due fufilment of our every-day duty, the answer is to be found in the exhibition of works of art executed by dentists, and shown in a collected form for the first time at this meeting. It is the great evil of specialism that it tends to narrow the faculty of observation and limit our range of interest, unless some persistent effort be made in an opposite direction, and, from this point of view, the art collection, small though it be, may be recognised as one of the most hopeful signs of our progress. But I must not keep you lingering longer over these hopes and fears of our life, they are bound up together, and whilst we hope that the work waiting to be done may be accomplished, we shall do well not to fear any lack of earnest workers. I want the world to see that the training of the dental surgeon develops some of the highest faculties that man possesses, and if I be asked to reduce these speculations to some embodiment, fulfilling all our hopes and disappointing all our fears, some reality that is appreciable by knowledge, sense, and sympathy, then let my last word be that we possess such an one in the person of our veteran leader, John Tomes.

NATIONAL DENTAL HOSPITAL AND COLLEGE.

THE Annual Dinner of the Past and Present Students of the above Institution took place at the Holborn Restaurant on Friday evening, November 20th, Mr. Oakley Coles in the chair. There were over ninety gentlemen present.

At the termination of the dinner, and after the usual toast to the Queen and Royal Family had been given, Dr. Morell Mackenzie rose to propose the toast of " The Dental Societies." In the course of a very amusing speech, Dr. Mackenzie referred to the vast amount of good work done by the different dental societies. Dental and medical societies, he thought, were of immense importance in the stimulating of industry and knowledge. It was a common peculiarity that man liked to shine among his fellows, and there was no doubt that many very valuable papers had been the outcome of that feeling, brought out by such societies.

It was also a very great advantage to come into personal contact with individual members of their specialties, as they were able by that means to cross-question their fellows upon the different theories advanced by them, and were thereby enabled to judge as to whether some of the arguments put forward were pure imagination or founded on fact. Societies, in addition, gave the young men an opportunity of ventilating their ideas, and in every way promoted that *esprit de corps* which characterised the medical and the dental professions. In conclusion, he said that it gave him very great pleasure to propose the toast of the three principal Dental Societies, namely, the Odontological and the Odonto-Chirurgical Societies, and the British Dental Association, and in doing so he begged to associate the names of Mr. Turner, Mr. Canton and Mr. Henri Weiss.

Mr. J. Smith-Turner said he thought there were many more very valuable societies, in addition to those mentioned, which came under the toast of the Dental Societies. Although he felt somewhat disappointed at being called upon to speak, yet he looked upon it as a pleasure and a great honour to respond to the toast of the Odontological Society. It was a society which he had taken a great interest in, and it was with their honoured chairman, Mr. Oakley Coles, that he had many years ago discussed at the Odontological Society questions of odontology; and as that gentleman was about to leave the profession for which he had worked so hard, and in its interests had used his utmost energy, it was with those memories of days gone by, associated with their chairman, that made the Odontological Society particularly interesting to him just at the present time. The Odontological Society was undoubtedly worthy of the attention of the young men of their profession, and he (Mr. Turner) was often very much surprised at the number of fresh faces which he was continually meeting and which were not to be found at the Odontological Society. Were they, as young members of their specialty, aware of the immense advantages to be derived from its membership? They must bear in mind that the dental profession had not been raised to its elevated position without the exercise of considerable self-denial on the part of its early members.

The Odontological Society had been the means of establishing for them the diploma of the Royal College of Surgeons, without which dentistry could never have reached the high position which it now enjoyed. The Odontological Society was an illustrious and flourishing one, and it was an honour for any one in the dental profession to belong to it. Its members met regularly every month during the session. It possessed an excellent library, and a museum which was second to none in the world. The museum had, during the last two or three years, been greatly enriched by the good work done by Mr. Willoughby Weiss—one of the staff of the National Dental Hospital and College. These facts alone should be sufficient to induce all the young men to join the society, and he (Mr. Turner) thought they could not consider that they belonged to their profession until they had joined some of its societies for the upholding of its rights and privileges, and the advancement of the knowledge of their specialty. As the humble representative of the Odontclogical Society, he begged to thank them for the way in which they had received the toast of their well-known society.

Mr. Canton, as representative of the British Dental Association, considered that, in wishing success to the Association, they were drinking success to the whole of the dental profession, inasmuch as the great object of the Association was the elevation of their specialty to the highest point. There were other societies mentioned by Mr. Turner, all of which were doing good work for the scientific department of their profession; but the British Dental Association aimed at its political aspect—an aspect which was of the greatest possible importance to them all at the present time. He felt he must say to those who were past students, and now practitioners, that it was their first interest to be a member of the British Dental Association, considering they were by that means binding together their profession. To the younger men he would advise their at once joining its ranks, even before the Odontological Society. As previously stated, the British Dental Association was formed for the maintenance of that which they were about to gain their living by, and it was to them, as young men, that the future carrying on of the work, began by the older practitioners, was to be carried on.

Mr. Henri Weiss, replying on behalf of the Odonto-Chirurgical Society, said that the society was founded in 1869, and was now under the able presidency of Mr. Bowman Macleod, and its members numbered 72. The Odontological Society was, of course, the mother society; but it was hardly to be expected that gentlemen could come from the north of Britain to attend its meetings, and hence he considered it highly satisfactory to have a society in Scotland having so many members and doing such a large amount of energetic and useful work for the extension of dental science. On behalf of that society he begged to return thanks, both to Dr. Morell Mackenzie for the way in which he had proposed the toast, and to the gentlemen present for the enthusiastic manner in which they had received it.

Mr. Stocken, in proposing the toast of the "Staff of the

National Dental Hospital and College," remarked that he felt quite incompetent to do justice to the task before him, but at the same time it gave him very great pleasure to have the opportunity of saying something in praise of such a number of distinguished gentlemen such as composed their staff. The list of names showed that much valuable time was expended upon the lectures and teaching given, and it was greatly to be hoped that the students fully appreciated the valuable services rendered by their teachers. Having alluded to the individual teachers, he referred to the lectures on Dental Materia Medica by Mr. Glassington, which subject he (Mr. Stocken) had introduced some years ago at that College as being one which he considered should not be left out of the dental curriculum. Altogether, the staff was a very worthy one, and if good men were not turned out in the future, there could not be any blame attached to the staff of the National Dental Hospital and College, whose health he asked them most cordially to drink, associating with the toast the name of Mr. Willoughby Weiss.

Mr. Willoughby Weiss, in reply, said the staff had always been anxious to do the utmost for the students, both in giving information to those who asked for it and also to those who did not ask it of them. Unfortunately there were some students who regarded their student life as a joke, and consequently did not pay the least attention to their instructors until they found out their mistake. It was, therefore, apparent to all that the staff had not only to instruct those who asked for such instruction, but also to give instruction to those who did not. He said he had the pleasure of being present during the inspection of the competitive clinical work in Operative Dentistry for Dr. Elliott's prize, and he felt more than proud at the excellent work exhibited on that occasion. He felt quite sure that better work had never been turned out at any other school or institution in England.

In conclusion, Mr. Weiss said he trusted that such annual gatherings as they had before them that evening would be continued for many years to come, for it was a means of knowing more of the social side of teacher and student—each being brought into closer relationship one with another. It was a cause for congratulation that they saw before them so many familiar faces, some having come three hundred miles so as to be present with them that evening.

Dr. Cunningham proposed the toast of "The Medical and

Dental Schools." He considered that some scheme for associating medical schools together would be a great advantage, especially with regard to the scientific work which was necessarily a part of the curriculum, and which would be taught in a more efficient manner by means of a higher school for that purpose. A great change had taken place in medical schools and medicine; and one of the things which had lately impressed him in that direction was the fact that whereas years ago they used to listen to very good lectures in their medical schools, at the present time, in the best schools, a man not only had his lectures and his practical work in anatomy, but he had also to do operations in physiology with practical histological work, such as medical men and dentists ought to do. Taking all things into consideration, he considered that a scheme for establishing a London teaching university would be hailed with delight by the majority, inasmuch as in London the organization could be more complete, centralized and efficient, though he regretted the absence of any recognition of Dental Science as such in the proposed scheme.

There was no reason why the dental-surgeon, in the preparation for his specialty, should not take a university degree, not as a specialty, but as a full medical degree. The curriculum had not changed very much within the last fifteen years, but he considered that the curriculum of fifteen years ago was not quite the one for the present time. He felt very glad to be present at a dinner of a college, the teaching of which was thoroughly in advance of the requirements of the curriculum. For instance, Dr. Elliott taught that very necessary part of a dentist's practice, namely, Operative Dentistry; Mr. Glassington gave a course of lectures on Dental Materia Medica and Therapeutics; the elements of Histology were also taught. There was, however, one feature which seemed to be overlooked in England, and that was what was known in America as Orthodontia, better understood as the treatment of irregularities of the mouth and teeth. Such a course would be an additional advantage to the National Dental College. He trusted some of the past students would pardon him for approaching the question of medical and dental schools from a young man's point of view, but he felt quite sure that if a higher education were taught, the young men would be in a much better position for carrying on still higher the noble work done n the past by their predecessors.

Dr. Stephen Mackenzie, in reply, considered that all specialists in practice should not be content unless the widest basis of education was established. It was desirable that dental students should go through the whole of the medical curriculum, so that they could use the full knowledge of pathology in the treatment of diseases brought before them. He considered it a very great pleasure to come amongst so very many members of the dental specialty, and could not but feel that, by associating more and more together, a common bond of union would spring up amongst all their professional brethren. The medical schools at the present time were not altogether in as satisfactory a position as they might be. The present time was a very exceptional one in the history of medical schools. That they were not united or connected with universities was a matter to be deplored. There was a question on foot as to the advisability of uniting them as a teaching univerity. Hitherto the dental section had not been represented at the Council which was considering that important question, and he sincerely trusted that dental education would have its representative on that Council before the establishment of the university in question, and thereby have its position fully recognised and a provision made for its requirements. It was a mistake that gentlemen passing through a curriculum equal to that of any university should be unable to obtain a degree in medicine.

The great majority of London students obtained their university degrees not in London. The London University was established to meet certain requirements, and, in order to justify its existence, it aimed at a very high standard. Whilst it had succeeded admirably in that, and the degrees were held in the highest esteem, at the same time it had shut out the great bulk of the profession from holding those degrees. It was a thing to be looked forward to in the future, namely, that if a Teaching University were established, every member of the dental profession should hold its degree.

Mr. Gaddes responded to the toast in behalf of the Dental Schools. That aspect of the toast was certainly a very important one, inasmuch as it struck at the very root of dental education, and consequently at the prosperity and success of the dental profession. Dental education was largely dependent upon medical schools. The dental student had to spend a considerable portion of his studies along with the general medical student, which he (Mr. Gaddes) considered to be of great benefit to a student of the dental specialty. It had been suggested that the whole of the dental education would be better carried out at a purely dental institution, but his opinion was that such would not be the case. With regard to dental schools, there were at the present time not only two in London, but one in Manchester, in Liverpool, in Birmingham, in Edinburgh, and in Glasgow. There was also one in Dublin. These were doing good work, and were tending to raise the profession in the estimation of the public.

Teachers in dental schools had much to contend with. The difficulties were even greater than those of an ordinary medical school—there being so much practical and individual instruction to give. He quite endorsed what Mr. Willoughby Weiss had stated with regard to those students who did not ask for information. If he might occupy the position of preacher but for a minute, he would say that there were two classes of students. First, the students who did not presume to know much; and, second, those who knew everything. Students of the former class were teachable, and they could make something of them; but for the latter, alas! he was sorry for them. During the ten years he had occupied the position of teacher he had unfortunately come across many who thought they knew more than he did as their tutor. If such gentlemen would take his advice, and "become as little children," it would then be possible to give them some help.

With regard to the dental curriculum, he was quite of the same opinion as Dr. Cunningham. They must move as the times demanded. The curriculum which was good twenty years ago was not necessarily good now, nor the one most desirable for the present time. There were several changes which could be made in dental education and examinations which would tend to the further advancement of the profession.

The Chairman proposed the toast of "The Past and Present Students." In doing so, he remarked that there were present many of the past students, he himself having been a student at their college some five-and-twenty years ago, then known as the Metropolitan School of Dental Science. There was also present amongst them his old friends, Major Rogers, Mr. Harrison and Mr. Weiss, who knew him at that early date. Undoubtedly an enormous change had taken place with regard to their profession. At least, if a man passed through his curriculum then, and attempted the same thing at the present time, he would find out an enormous difference. The toast of "The Past and Present Students" was the toast of the whole of the dental profession. The National Dental Hospital and College had made a distinct impression upon the profession throughout the United Kingdom, in fact throughout the whole of the world. Ten years ago he entered upon the staff of the National Dental Hospital as an active member. At that time evil days had come upon the institution, but old friends rallied round it, and there was every evidence of its success and usefulness from that time. He wished the present students to understand that their duty did not come to an end with their student life. The obligatión they owed to their profession could never cease as long as they lived. In all aspects it was their duty to promote its best interests to the utmost of their power. They were bound to develop not merely the capabilities of their profession, but of their individual self.

The prosperity of a profession did not depend upon its corporate capacity, but upon its individual units. It was individual effort and interest which would help to raise the standard of their profession. It meant self-sacrifice. If they looked around that evening they would soon see what he meant, from the good work done by such men as were present that evening in the persons of Mr. R. Rogers, Mr. J. Smith-Turner, Mr. James Parkinson, and others.

With regard to dental education, he believed in one dental school for London, but many dental hospitals. For many years he had advanced that opinion, and, at this, the last chance he should possibly have, he again begged to lay stress upon it. Many men could be found who could teach clinically with the microscope, &c., but it was only here and there that a man could be found who could be a thorough teacher of men. The teaching of dentists should be conducted by those who could devote the whole of their career to that particular part of the work. If teaching was conducted in a number of dental schools, it was absolutely impossible for a man to give clinics, and attend to that class of work, and teach thoroughly at the same time. The dental hospitals in London should be multiplied, but there should be one central school in which all the faculty of the profession should be fixed, and by that means they would take the first place as a teaching body in this vast metropolis.

The names of Mr. Rogers, as a past student, and Mr. Fisk, as a present one, he begged to associate with the toast.

Mr. R. Rogers in reply, said that it was a very great pleasure to have had the opportunity of dining with Mr. Oakley Coles before his retirement from the profession. Mr. Stocken had eulogised the good work done by the staff of the National Dental Hospital and College, and he felt sure that all past students, including himself, fully appreciated the good work which had been carried on at the institution.

Mr. E. C. Fisk replied on behalf of the present students, and in doing so referred to the good feeling which existed between the students and the staff, and which, he said, it was the earnest desire of every present student to keep up. He felt quite sure that the work of the staff was fully appreciated by every student, although the latter no doubt appeared at times very careless. They considered themselves very fortunate in having the valuable services of Mr. Gaddes, who was always willing to give them every help possible in their work. He was quite certain that they should, one and all, look back with the greatest possible pleasure to the time spent at the National Dental Hospital and College.

Mr. Weiss, in proposing the toast of "The Chairman," said: I consider it, gentlemen, a great pleasure and a privilege in being permitted to say that I have enjoyed the friendship of our chairman for over twenty years, and that I appreciate his sterling worth, his great ability, and, above all, his remarkable perseverance. For over a quarter of a century, as he has said, he has been with us; for nearly twenty years of that time he has taken an active part in our proceedings, joining in our debates and assisting in our hospitals. Since 1867, when he entered the Odontological Society, his name has been familiar to the whole profession, and during the last fifteen years he has written and delivered many papers and compiled books relating to every branch of our science. It is very rarely that we are called upon to scan a life of so much industry, and, I may add, so much usefulness. It is easy enough to point to men who have had their pens in their hands for over fifty years but we seldom find in one individual so varied an ability brought to bear upon all that he has done so much that is original in research. I have no occasion to catalogue his literary efforts, for I believe they will live to tell a coming generation the character of men we had amongst us. But the study has not occupied all his time; this very institution lay enfeebled and prostrate when he joined it. His hand seized the helm and his voice instilled new vigour into those around him, and he never left his post until he had steered the "National" into a safe harbour, where it now remains, and where I feel convinced it will continue to prosper.

Mr. Weiss next alluded to the chairman as a bold speaker, and remarked that he had never been afraid to stand to his opinions, because he always thought out what he had to say, and that he had enriched our debates the *Transactions* of the Odontological Society will show.

In asking you to drink his health, at a student's dinner (he continued) I have no occasion to remind you how much he has done for students, or how widely his pleasing address and his many contributions have advanced their studies. We will not for one moment believe that a man of so much activity has come to the end of his career—he has merely terminated one chapter, and we have no authority to enquire why he has thought fit to change the direction of his labours. Of this we may feel assured, that whatever his walk in life may be, it will be a useful one—it will be for the advancement of civilization and the good of his fellow-creatures. I am quite convinced that he could not have bid adieu to his former professional brethren under more agreeable auspices, surrounded by the students he has helped to advance, and the officers with whom he has worked. Although this is purely accidental, the last act of his professional life will at least give him confidence, for it will assure him how cordially we all of us respond to this toast, and how heartily we desire that health and prosperity may go with him into the life which is before.

Mr. Oakley Coles replied by thanking Mr. Weiss for the very kindly words which had been spoken by him, and the company for the very enthusiastic reception given to the toast of his health. In leaving the dental profession, he considered he was only extending a field of usefulness. Self-sacrifice was necessary in all professions, and the words which he had heard from Mr. Weiss, and the expressions of good feeling from all that evening, were sufficient to stimulate him for greater service in the future. It assured him of the fact that any faithful service done towards one's fellow-men were never forgotten by them.

The toast of "The Visitors" was proposed by the Chairman, and replied to by Mr. James Parkinson and Mr. William Rose.

The speeches were enlivened by songs and recitations given by students and friends.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

The first meeting of the Session 1885-86 took place on the evening of November 12th, at the Rooms of the Society, 30, Chambers Street, Edinburgh, Mr. W. Bowman Macleod, L.D.S.Edin., President, in the chair.

The President, in opening the Session, made a few remarks in acknowledgment of his election to the Presidential chair.

Mr. Wilson exhibited the upper models of two cases having relation to Dr. Edwards' paper.

In the first there were, on the right side, a central, a geminated lateral (two laterals), and a canine, all temporary; on the left, a permanent central, with a lateral and a canine, both temporary. The central had succeeded a geminated tooth (central and lateral).

In the second, the second premolar on the left side was represented by a rudimentary tooth whose crown was hemispherical. On the opposite side the temporary tooth was still in place.

Mr. Lipscomb made some observations upon a case of a gentleman, about forty years of age, who had called upon him, complaining of a nasty taste in his mouth, especially when he awoke in the morning. He had been troubled for about two years. He found that his health was suffering a good deal in consequence, and that he was getting weaker every day, this condition being, however, associated with comparatively no pain. He had consulted his doctor at intervals during the two years, but with no beneficial results. On examining his mouth, Mr. Lipscomb found his teeth in good order, but the upper left wisdom tooth missing. As the patient then stated that he did not think he had had a tooth extracted from that position, the cause of the trouble was very easily diagnosed, viz., that it was the discharge from a fissure in that region. A free incision was then made up to the alveolus, and plugged well with cotton wool saturated with a weak solution of carbolic acid. In a few days, the plug having been renewed, Mr. Lipscomb succeeded, after some considerable difficulty, in removing the tooth, the reasons of which difficulty would be very obvious to anyone examining the tooth, as the roots were largely exostosed, and there was the danger of breaking away the posterior wall of the superior maxilla to be borne in mind—a by no means impossible accident, considering the porous nature of the bone. The wound was dressed for a few days with solutions of chloride of zinc and carbolic acid alternately, and a tonic prescribed. He soon began to put on flesh and gain strength, and has made a complete recovery.

Mr. Campbell said—About a year ago he extracted, after a good deal of trouble, an unerupted wisdom tooth, the details of which he thought worth mentioning in connection with Mr. Lipscomb's interesting case.

The patient, a lady aged 49, had suffered from neuralgia more or less severely, on the right side of her head and face, for five years. For two or three months before she came under his care her suffering had been very great. She had consulted several medical men, but without relief. He (Mr. Campbell) knew the lady's husband, who spoke to him casually about his wife's great suffering. He suggested an examination of her mouth, which proposal was acted upon, but the teeth appeared to be perfectly sound. He noticed, however, that the right upper wisdom tooth was missing, and from the fulness of the gum, did not seem to have been extracted. On enquiry, he found the patient had never had a tooth removed from the upper jaw. From the symptoms, and the appearance of the mouth in the region of the upper wisdom tooth, he came to the conclusion that this tooth was not erupted, and the probable cause of all the patient's suffering. After consultation with the family doctor, who happened to be an eminent surgeon, it was agreed to put her under chloroform, and examine the state of matters. This was done, and when the gum and alveolus had been cut through, the instrument came upon the enamel of the wisdom tooth. Feeling now fully assured of its presence, he proceeded to extract it, but never before experienced so much difficulty in removing a tooth from its socket. The tooth in front, and a part of the alveolus surrounding the wisdom tooth, which proved to be extremely dense, was removed, and even then it was with considerable difficulty that the tooth was at last extracted, it having to be literally gouged out. The tooth was slightly carious and considerably exostosed. The patient of course suffered a good deal for a week or two after the operation, but has since been quite free from pain.

The President then read the following paper, forwarded to him by Dr. H. H. Edwards, D.D.S., of Madrid, illustrated by nine drawings of models, and also a model of a supernumerary incisor carved in ivory :—

THE MISSING INCISORS IN MAN. WHICH ARE THEY?

Gentlemen,—In presenting the accompanying drawings to your excellent Society, I will, with your indulgent permission, supplement them with short descriptions of the same; also, if not trespassing too much on your valuable time—to say nothing of your patience—will endeavour, in as brief a manner as possible, to add a new argument to this highly interesting subject.

In the first place, allow me to publicly thank Mr. Wilson for having brought the subject to my notice, it being the publication of his able paper that set me thinking. Also, allow me to pay tribute to the courtesy of your present able President, for kindly arranging to bring my feeble effort before your society.

Description of Cases Presented.

No. 1 represents a mouth in which the six incisors evidently are intact. The canines were extracted when the patient was a youth, in order to correct an otherwise great inconvenience and deformity. The supernumerary teeth are those, one on either side of the median line. The one on the right side being a geminous tooth, the supernumerary half of which would naturally follow the central type.

No. 2. This case presents a supernumerary tooth erupted to the left of the median line, and extraordinarily well placed in the line of the arch. This tooth is, in all its appearances, a supernumerary tooth of the central type.

No. 3 is the model of a supernumerary tooth erupted to the right of the median line. This case is a common expression exhibited by supernumerary teeth, and requires no more mention than to say I believe it to follow the central type.

No. 4 presents a case which, with our present knowledge, we presume that the left side of the mouth is normal; but on the right side of the mouth there exists a space between the central incisor and the—as Prof. Turner puts it—pre-canine. This pre-canine evidently is a supernumerary tooth, small but partaking of both forms of central and canine; a sort of nondescript, which may or may not be a diminutive type of the, so put forward, missing outer-third incisor. But why—when, as in this case, there is a certain space left open—the lateral incisor is suppressed and this supernumerary tooth created, is a matter for discussion and investigation beyond my power.

No. 5 is a somewhat similar case as the preceding one, with this exception, that the open space is between the lateral incisor and the canine on the right side of the mouth. In this case, the lateral incisor has erupted, and Nature seemed willing to leave space enough for the eruption of the outer-third incisor; but it was not forthcoming.

No. 6. This case is another exhibiting spaces left for the eruption of teeth, and the non-fulfilment of the same. This, if the centrals had been close together, would be a very common expression of the suppression of the lateral incisors. It is a question as to whether the spaces left between central incisors may or may not be intended by Nature for the eruption of teeth.

In No. 7 is exhibited an arrangement of the teeth, having the left lateral suppressed, and the canine well up to, and touching, the central incisor. I should also say that the right lateral incisor is suppressed; the pre-canine, though not clearly shown in the drawing, in the model it has the decided appearance of being—as in case 4—supernumerary.

No. 8 is a carved imitation in ivory of a specimen that came into my hands not long ago, having been extracted in order to clear the mouth for an artificial denture, and given me by the patient on account of its peculiarity. It is evidently a geminous lateral incisor. Here seems strong evidence in favour of the outer-third incisor. I have never seen a similar tooth, and I believe it to be a rare and interesting specimen. In the original, a bristle can be passed into each pulp canal.

No. 9. It is but a few days since this case came to my notice, and I include it, as shewing that the expression of No. 7 may appear on either side of the median line.

In cases Nos. 1 and 8 I have used the term "geminous tooth," and I believe I am right in doing so, though hardly in accordance with Prof. F. Flagg, Phil. Dent. Col., U.S.A., who says that "practically geminous teeth have but one pulp," and the cause of gemination is "abnormality of crown tissue." In case No. 1 it may be so, for we cannot diagnose a tooth in the mouth as possessing one or two pulps; but in case No. 8, although the crowns were joined during the process of creation, the roots are distinct, and each one possesses its separate pulp canal. They are not "attached teeth," for "though *they* have separate pulps their roots are attached to each other by the intervening walls of their alveoli: bone and cementum not uniting." Neither are they "fused teeth," that phase being brought about by exostosis or mal-position; consequently I hold to my right of calling them "geminous teeth."

It is perhaps needless to say I have cross-examined each of these patients—who are all educated, intelligent people—one of them being the present Home Secretary—to find out if any extractions had been done when young, for, I am sorry to say, there are dentists in this country who, through ignorance, are liable to extract a permanent tooth for a temporary one; but they all affirm that no such extractions have taken place.

I must apologise for the few cases presented, but I have presented them by selection, so as to cover the majority of variations that have come under my notice, which are many and variable; indeed, Nature seems to "ring the changes" upon the arrangement of these supernumerary teeth in a prolific manner.

Supernumerary teeth are undoubtedly presented to us by the great law of inheritance, the principal forms of which law may be divided into continuous, interrupted, collateral, and atavic.

The appearance of these supernumerary teeth is, I believe, due to the law of atavism; but upon whose authority we have it that pre-historic man possessed six incisors I know not, unless it be that of the "Evolutionist." I believe there are many who do not believe in the theory of evolution, but I will leave that question for more experienced men than I to argue. One observation I will make, though. I suppose that atavic characteristics appearing with comparative frequency is an effort on the part of Nature to bring to our notice forgotten facts—doubtless for our edification—though for our use is questionable. As in chemistry, our professors tell us that no matter what changes take place, no particle of matter is lost; so in Nature, to those who can read aright, no information is wanting, though seemingly lost, to instruct us in what existed pre-historically. She is full of signs and warnings, but there is a want of ability on the part of man to read her with sufficient intelligence.

There is an interesting article in the *Cosmos* for September, entitled, "Heredity and Development of the Teeth," by Dr. Alton Howard Thompson, which will bear careful reading. Although the "missing incisors in man" may or may not have been in his thoughts, I may be permitted to quote somewhat relating to that subject. He says, "The suppressive effects of disuse as affecting development of the teeth through heredity and variation are also to be noticed. In no class of organs are the inherited effects of variation due to the influence of changed conditions so marked as in the teeth of man. Being thus susceptible to the effects of active employment or of neglect, they have, by the protracted operation of disuse weighing upon them and retarding their production for generations, become, as one of its effects, so defective and incomplete as to approach the condition of rudimentary organs. The active employment of an organ makes demand upon the nutritive powers for its growth and strength, which is responded to by increased nutrition and added strength by those powers; and use gives an impetus to transmission, which causes that organ to be well and strongly developed in the next generation. But disuse furnishes no stimulus to either nutrition or transmission, and the organ so affected is produced as a tradition due to the stimulus of past generations, when it was in active employment, but owing to its disuse in recent generations, it is weak and ill-formed; it has not the necessary stimulus either for development or strength. Not only that, but an organ that has fallen into disuse and neglect becomes deleterious and injurious, and is, by a natural process of economy of growth, deprived of nutrition, that it may be suppressed and aborted. The remains of many such organs linger in the organisation of man as rudiments of former organs which served a useful purpose under different modes of life; but the conditions of life being changed by new environments, these organs became useless, then injurious, and were gradually suppressed by the law of economy of growth. Such organs the teeth of man are rapidly becoming. Indeed the wisdom teeth have already arrived at that stage in their career of suppression when they are little more than rudiments. They are never well organised, are often rudimentary in form, and often totally absent, either through failure to erupt or development. The wisdom tooth in the race is departing, and we are the contemporary witnesses of the act of its abolition as a useless organ. Will the second molar follow it in time, and then the other teeth in more or less regular succession? We do not know, we only speak of what we observe. But we do know that all the teeth are defective in form, and deficient in structure, in most of the individuals of the luxurious races of man."

He does not appear to have noticed particularly the suppression of the lateral incisors, but only mentions that of the third molars. I will refer to the third molars later on.

Dr. Thompson also quotes M. Topinard (Anthropology), who says, "The most remote ancestors have their share in forming the individuals, as well as the immediate parents. In atavism, the reappearance of character is a matter of chance, or rather there are in the germ latent powers, which are awakened into activity by favourable influences."

Also, he quotes Dr. Norman W. Kingsley, who says, "It is a most wonderful subject for contemplation, that at some remote period in the history of our progenitors, when Nature departed from the normal type, to produce, say, a deformed lateral incisor, a twisted cuspid, or to suppress a lateral, or a third molar, that following down the line of descent we find precisely the same peculiarity appearing and reappearing in the same line; and, again, not in the line, but in different branches of the family."

Of course if we ask for a reason why Nature interferes with existing laws to present us with a past specimen of her handiwork, we shall get no satisfactory response. In answer to an article of mine recently published in the *Dental Practitioner*, U.S.A., Dr. Dwight Ingersole says, among other good things, "The reason why Nature permitted physical laws to interfere with the laws of the organic kingdom has been asked for a thousand times, but no satisfactory answer has ever been given, because there is no reason for anything that has been brought into existence, the action of law. Nature seems to be blind and deaf to reason, and is arbitrary in all her ways. A reason was never given for anything until man came endowed with reason, and since his advent has seemed to be perfectly contented in allowing him to manifest the little he has, in his own way." I may add that there is great truth in the foregoing, notwithstanding its terseness.

Well, then, if Nature stands aside and leaves us to reason these things out, being content only to present us with the enigma, our duty evidently is to stand in the breach *a l'outrance.*

The question before us concerns the incisor teeth, but if I may be allowed to make a short digression, I would like to say a word about the molars. How many molar teeth did pre-historic man possess? Our nearest kinsfolk, I presume, by the law of evolution —if accepted—are the Simiadæ, of which there are three families, namely:—1, Arctopithecini; 2, Platyrrhini; and 3, Catarrhini Now, these worthy kinsfolk—begging the pardon of any susceptible gentleman present—though their incisors are the same in number as our own, they somewhat differ with regard to the number of their pre-molars and molars. No. 1 possesses 3 pre-molars and 2 molars; No. 2 possesses 3 pre-molars and 3 molars; No. 3 possesses 2 pre-molars and 3 molars, on either side, above and below. I mention this for the following reason:—Some ten years ago I extracted a tooth—supernumerary of course—from the mouth of a woman in the west of England that had the appearance partly of a bicuspid and partly that of a molar, but very small. It had erupted buccally between the second and third molars on the right side of the upper jaw. As it is an undisputed fact that the third molar is being suppressed, and in everyday practice I see numbers that are little more than rudimentary, it may be that the third pre-molar has been suppressed. One case is not sufficient to prove anything, but if there are other gentlemen who have met with similar cases, I would like very much to know their opinion. Certainly it would strengthen materially the theory —if so be there is a theory—of the suppression of outer thirds, namely:—The third molar, the third pre-molar, and the third incisor. Whoever has noticed the jambing and difficult eruption of the lower third molars that so frequently takes place, must also have remarked a shortening of the jaw itself, at its posterior portion. The law of economy of growth will not admit of superfluous organs, or parts of organs; therefore, if the third molars are to be suppressed, the jaws will shorten in consequence; or if the jaws take the initiative, then the molars must be crowded out.

Now let us return to the incisors. If so be that pre-historic man possessed six incisors, the question is—which pair or pairs have been suppressed?

At the outset, I think it is of vital interest that the period of eruption of the supernumerary teeth should be carefully recorded. I have never been fortunate enough to see a supernumerary tooth during the process of eruption; it would doubtless be of use in ascertaining to which type it belonged, and serve as useful data, so that we might reasonably fix the succession in which it originally erupted. If, by the law of atavism, the suppressed tooth appears, its appearance, by the same great law, should take place in its original succession. We know that the central incisors erupt at the age of 6-8 years; the lateral incisors, 7-9 years; and the first bicuspids from 9-10 years. Therefore, if the supernumerary tooth be of the lateral type, it should erupt between the ages of 8-10 years; if, on the contrary, it be of the central type, according to the position in which we place it, namely, as a suppressed *central*, it should erupt between 5 and 6 years of age; while, if a lateral following the central type, between the ages of 6 and 8 years.

I have no doubt that some gentlemen will take exception to my fixing a date for the eruption of supernumerary teeth, and may with fairness say, that if in form these teeth are erratic, their eruption may also be erratic, and, therefore, cannot form a reliable basis.

And now for a "new departure." Since having my attention drawn to this subject by Mr. Wilson's paper, I have differed somewhat in my mind from his views, and am more inclined to look upon the supernumerary tooth as being a rudimentary *central*.

The incisors are the teeth of prehension, and the centrals naturally are the most prehensile; therefore, if suppression has taken place through disuse, I infer that the original centrals would be the first to disappear. That the present lateral incisors are *now* being suppressed is not denied. But why? Because the present centrals still find sufficient employment to warrant their continuance, whilst the laterals are becoming more and more superfluous. In about 25 per cent. of my patients, I find the central incisors separated, while the lateral incisors of 50 per cent. possess cutting edges inclining more towards the canine arc than following the central cutting line. As a curious coincidence, whether arising from observation or professional direction, the manufacturers of artificial teeth are making their lateral incisors every day more and more like unto the happy medium between centrals and canines, namely, with rounded corners; they profess to have made them from impressions taken from the natural teeth, and in practice, whether for pivoting or plate making, that is the class of tooth I mostly use. It may possibly be a peculiarity possessed by the Spaniards, but, as I say, I find a goodly per centage with spaces between the centrals, the centrals small in comparison with the canines and molars, and the laterals possessing the intermediate form between centrals and canines, even to the labial longitudinal ridge. The above observations being forced upon me daily, with an occasional supernumerary tooth or teeth in the medium line or space, as in cases Nos. 1, 2, and, perhaps, 3, make me strongly inclined toward the idea, namely, the suppression of the original *centrals* from generations of disuse.

Of course this is only surmising, but I would present the idea, with a view of widening the field of vision. We know that a solution sought for is invariably found, provided we wish that particular solution to *be* found; if a man wants a particular cause in order to explain a particular lesion, he will generally adopt that one which appears right to him, and work hard at his proofs, not deigning to accept any innovations. It is partly with the idea of aborting such a catastrophe that I have presented the possibility of the supernumerary tooth or teeth as being suppressed *centrals.*

If the idea—mind, I assert nothing—brings forth good fruit in the shape of a thoroughly useful discussion of the subject I shall be satisfied; often a dissenting voice will either clench the accepted idea, or it will set men thinking of other possibilities.

On such meagre evidence as we possess, it is the wildest folly to found a theory; all we can do is to collect facts that will enable the next generation to form a firm basis. Facts, gentlemen, facts! Let all collect, accumulate, and register them in such quantities, that when *we* are gone there may be no excuse for the coming physiologist to taunt us with idleness or indifference.

In conclusion, gentlemen, I would earnestly impress upon all professional men, especially those whose practice commands the care of children's teeth, as in dental hospitals, to watch the development of these supernumerary teeth, and to carefully, record all such cases that come under their notice.

As the paper was one which required some amount of thought it was considered better to postpone the discussion upon it until the next meeting, by which time the paper would be in the hands of the members; and it was decided to have woodcuts made of seven of the more important illustrations for the better consideration and study of the cases in question.

The President then proposed that Dr. Edwards should be elected as a corresponding member of the Society, and that a vote of thanks should be accorded to him for the labour and trouble he had been to in order to bring the matter under their notice, both of which propositions were carried *nem. con.*; and the Secretary instructed to communicate the same to Dr. Edwards.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting was held on November 2nd, Mr. Charters White, M.R.C.S., L.D.S.Eng., Vice-President, in the chair.

Mr. T. A. Rogers, in a very felicitous speech, presented to the Society, on behalf of a few of the oldest friends of the Treasurer, a portrait in oil of Mr. Parkinson.

The Vice-President gratefully accepted, on behalf of the Society, the valuable present which was offered to it, and which would be prized by the younger members and their successors as long as the Society existed.

Communications were made by Mr. W. C. Dunn Florence; Mr. S. J. Hutchinson; Mr. A. Underwood, and Mr. Storer Bennett.

Mr. F. H. Balkwill, L.D.S.Eng., read a paper upon a METHOD OF MOUNTING PORCELAIN CROWNS ON PULPLESS MOLAR ROOTS. The antiseptic practice of treating pulpless teeth for filling has given us confidence in retaining pulpless roots. To utilize these for the support of a crown has been successfully performed by several methods, the best of which is a hollow crown of gold plate made so as to closely clasp any available portion of the natural tooth. But while the Richmond crown is very efficient, it requires so much skill and time for its application that it must always be an exceptional operation.

In the crown which will be brought before you to-night the object has been to produce a plan comparatively easy.

Two principal difficulties are met with: first, the size, shape, and position of the roots of molar teeth forbid the use of stiff pivot wire to fix the crown. Secondly, as a fixed pin cannot be used, the crown must be in the form of a cap to hold a cement which is to retain and support it when hard; the difficulty is to keep the crown in place until the cement hardens.

Messrs. T. Lemale & Sons have produced a crown from my designs which meets these difficulties with some success. It is of porcelain, about the size and depth of an average natural crown; hollow, so that when placed upon a root, it rests upon a thin margin; in the middle of this hollow, under the centre of the crown, is a second smaller chamber much undercut, to act as a cavity of retention. At the four corners of this cavity are four little cornices to strengthen the neck of the cement when packed in the cavity, by forming struts or buttresses. In the centre of the retaining cavity a thin, headed platina pin is fixed, which protrudes sufficiently from the under surface of the crown when in place to reach to the bottom, or near it, of the pulp cavity in the natural root.

It is applied in the following manner:—The root canals having been first treated and filled, and the margins dressed down with a flat file, level with the gum, the general surface of the root is ground concave with the burring engine. A model is now taken and sent into the workroom to be poured, and whilst this is being done, the operator proceeds to form the pulp cavity into a retaining chamber of as nearly as possible the same form as that in the porcelain crown. If the roots are large and advantageously placed, smaller retaining pits are drilled a short distance into them. A crown is now fitted on the model in the workroom, and readjusted in the mouth until it fits, root and bite. Should the platina pin be too long, it may be bent up a little or cut short and a fresh head of soft solder attached. Some Stewart's Sullivan's cement is now thoroughly well levigated, first in dilute sulphuric acid, and then in water for several minutes until it becomes very plastic; this is divided into two portions, one of which is wrung in a napkin as dry of mercury as possible. The crown is then taken in the hand and some of the more plastic portion is well packed with suitable pluggers to fill the retaining cavity. The hollow of the crown is now to be filled with the drier portion, being well tamped around the pin to unite it with that first put in; it is then packed up to the top of the pin and smoothed off so as to leave it in the form of a cone or pyramid. The cavity in the root, having been well washed and dried, is next filled with the plastic portion of cement, and then with a straight instrument a conical pit or depression is scooped in it to receive the cone of cement in the crown; this is now put in and pressed in place, with a slightly oscillating, rotating motion, after which the patient is directed to bite it into place; the overflow is cleared away and the patient dismissed with a caution to regard the tooth until the next day as if it had a newly exposed nerve.

Mr. W. Hern also read a paper on a METHOD OF TREATMENT OF DEAD TEETH.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

EXAMINATION QUESTIONS.

The following questions were given at the written examination for the Diploma in Dental Surgery on the 4th ult. :—

ANATOMY AND PHYSIOLOGY.

1. Give the distribution of the Fifth pair of Cerebral Nerves, and the Ganglia with which they are connected.
2. Trace the course of the Circulation from the Left Ventricle to the Right Auricle, and mention the principal changes undergone by the Blood.

SURGERY AND PATHOLOGY.

3. Describe the varieties of Nasal Polypi, their symptoms and appropriate treatment.
4. Describe the process of Suppuration, and give the treatment.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Describe in general terms the Dentition of Batrachia and Reptilia. Mention any special peculiarities in the dental tissues which occur in these groups.
2. Describe the manipulations necessary in order to demonstrate microscopically—(i) Nasmyth's membrane. (ii) Dentinal fibrils. (iii) Interglobular spaces.
3. What defects in form and structure specially predispose teeth to the attacks of Dental Caries? Which are the vulnerable spots in the several teeth?

DENTAL SURGERY AND PATHOLOGY.

1. What are the various forms of Odontomes? What is their structure? To what symptoms do they give rise?
2. What methods should be adopted in filling the roots of—
    - (i) A tooth, the pulp of which has been recently devitalised?
    - (ii) A tooth, the pulp of which has been long dead?
3. In the preparation of the mouth for the insertion of artificial dentures, when should the roots of teeth be retained, and when should they be extracted?

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

PASS LIST.

THE following gentlemen were admitted Licentiates in Dental Surgery, after examination, on November 4th, 5th and 6th:—Booth, Richard B., Charing Cross; Collett, Edward P., Middlesex; Goadby, Allan L., Charing Cross; Helyar, Albert; Jeffery, Louis, Middlesex; Maberly, John, Middlesex; May, Robert, Charing Cross; Murray, Harold, Middlesex; Palethorpe, William; Pedley, Samuel E., Charing Cross; Richards, George Oliver, Charing Cross; Roaw, Robert W., Guy's; Sexton, Louis E., Charing Cross; Williams, Tom Gill, Charing Cross. All the candidates passed.

CORRESPONDENCE.

To the Editor of the DENTAL RECORD.

SIR,—I was glad to find in the Journat of the B. D. Association for this month, a letter from a member complaining of an expression in Mr. Fisher's paper, read at the last meeting at Cambridge. I quite agree with all that "a member" has said, and I think if the Committee allow a similar expression to be used in any paper read at a future meeting they will find a large falling off in the number of members of the Association. With regard to the Editor's note in the reply I think it very unsatisfactory, and instead of smoothing matters, tends to the opposite. It may be that a *sine curriculo* man would not obtain such an appointment as Mr. Fisher speaks of, but it certainly was very bad taste to tell the fact so plainly in the face of men, many of whom, no doubt, were *sine curriculo* men. It appears to me that that was a point which might have been left until Mr. Fisher saw some chance of his ideas being carried out. Mr. Fisher must bear in mind that a man like myself (and there are a great many) who has had nearly twenty years of active practice, must have gained more experience than a young man just come from College with his Dental Diploma. It is, of course, a very good test of a man's ability, he having gone through the full curriculum, but it is not a sure test, as I have seen work that has been done by curriculum men that I should consider a disgrace to a man who had filled but half-a-dozen teeth. A friend tells me Mr. Fisher is a young man and has rather strong views, and he would not have been surprised had Mr. Fisher advocated the candidate being a Scotchman.

I hope you will be able to give space for this letter, as I think many may see it in the *Record* who are not readers of the Association Journal.

Yours truly,

ANOTHER MEMBER OF THE B. D. ASSOCIATION.

November, 1885.

OBITUARY.

It is with extreme regret that we have to announce the somewhat sudden death, at the age of 46 years, of Mr. Alfred Tribe, F.R.Inst.Chem., F.C.S., which took place on the 26th ult. About two years ago he suffered from an attack of inflammation of the bowels, from which he recovered, and was able to resume his duties, though his health was not very robust. He succumbed to a second attack of a very acute form, which ran its course in a few days. Mr. Tribe has for many years been associated with the Dental profession. As quite a young man he assisted the late Dr. Bernays as Lecturer on Metallurgy at the Metropolitan School of Dental Science, afterwards undertaking the full duties of that chair. In 1877 he was appointed Lecturer on Metallurgy at the National Dental College, where he lectured up to last winter session. He was also for many years Professor of Chemistry at Dulwich College, and his efforts on behalf of giving increased importance to the teaching of science in the College were not without success. Of late years he has, likewise, been working, in conjunction with Dr. Gladstone, at the subject of Electro-Metallurgical Deposits. His Secondary Battery for the storage of electricity was also a work of considerable labour and investigation. His candidature for the Fellowship of the Royal Society was supported by Professor Tyndall, Dr. Gladstone, and other eminent Fellows; but his days are ended, and that honour cannot now be bestowed. He was a man of quiet and unassuming manner, and, dying in the prime of life with the harness on, had scarcely begun to reap the result of his scientific labours.

Mr. H. Harris, in a paper read before the Meteorological Society, on the 18th ult., gives a daily account of a typhoon from its origin, in 1882, near the Philippine Islands, through Japan, over the Rocky Mountains, the Northern States and Canada, across the Atlantic and Europe, to the Baltic, where it dispersed. In the Atlantic it was joined by another disturbance from a different direction, the junction of the two being followed by a cessation of progressive movement for five days. This typhoon travelled 16,000 miles in thirty-six days.

Editorial.

RETIREMENT OF MR. OAKLEY COLES.

It is always a source of regret when active and valuable service is withdrawn. Occasionally we have to record the loss by death of a professional brother, but on the present occasion it is the seceding of a living member of our specialty that is the subject of observation. During the past few months the retirement of Mr. Oakley Coles has frequently been alluded to. His relinquishing the Secretarial work of the Benevolent Fund and the membership of the Representative Board of the British Dental Association, was noted in our report of the Cambridge Meeting. And what may be regarded as his "leave-taking" of the Dental Profession took place at the Annual Dinner of the Past and Present Students of the National Dental College (see page 550). The kindly words uttered by Mr. Weiss will be appreciated and re-echoed by every one who is at all acquainted with the work and labour—the professional life—of Mr. Coles. His many written works; his editorial labours; the help of his valuable suggestions, advice, and energies, in numerous ways and forms—in connection with Dental Reform, with the National Dental Hospital, the National Dental College, the Dental Hospital of London, the Journal of the British Dental Association, the Benevolent Fund, as Secretary, Councillor, and Editor of *The Transactions* of the Odontological Society—at once serve to indicate that it is no mere drone that is leaving us for other fields and pastures new.

Where there is a marked individuality, as in Mr. Coles' case, dissensions must inevitably arise. All actions cannot be equally good. Whilst the factors are humanity, the results must be human.

But it is the Dental Profession, perhaps above all other professions, that now stands so much in need of quickening spirits and labourers worthy of the hire which can alone be given—faithful service never forgotten. The retirement of one who has already done so much, and still is fit and has the ability to work on, is a loss that our profession can ill bear. We heartily wish him every success in the sphere of the Church which he is about to enter.

GOSSIP.

PROF. MCKENDRICK and Mr. J. J. Colman find it impossible to permanently sterilise animal matter by exposure to the low temperature now at the command of physicists. Microbia survive the cold. Even a frog has recovered from having been frozen solid by exposure for half-an-hour to temperatures from 20° to 30° Far.

THERE appears to be no truth in the alleged power of Egyptian mummy wheat to preserve its vitality for an indefinite period. Those mummy wheat grains which have grown when planted are believed to have been modern grains inserted into the mummy cases or vases by enterprising and untruthful Arabs. This fraudulent introduction of modern plants into the sarcophagi of the mummies is a very possible source of error.

AT a meeting of the Medical Council, on the 19th ult., the qualification of Mr. H. F. Partridge was ordered to be removed from the Dentists' Register.

ARRANGEMENTS are being made to hold the Annual Dinner of the Past and Present Students of the Dental Hospital of London on Saturday, January 30th.

IT is understood that Mr. Arthur Underwood has been appointed acting editor of the *Journal of the British Dental Association.* The Association is to be congratulated on having secured the services of one so well acquainted with the practical, scientific, and educational departments of the profession.

THE number of new students at the Edinburgh Dental School at the commencement of the Winter Session, on November 2nd, was eight. The total number of students on the roll being eighteen.

IN a new work on the "Story of the Heavens," by Prof. Ball, Royal Astronomer of Ireland, there is a chapter on star clusters and nebulæ, which closes with the following sentence:—"We have reached a point where man's intellect begins to fail to yield him any more light, and where his imagination has succumbed in the indeavour to realize what he has gained."

During the official year the Dental Board of Examiners of the Royal College of Surgeons of England examined twenty-four candidates, of whom seventeen were admitted Licentiates in Dental Surgery.

In the account given on page 519 of the Art Exhibition at Cambridge, the repoussé plaque and the two specimens of demonology should have been described as designed by Mr. Oakley Coles, and executed by Mr. W. F. Lord, L.D.S.I., as was also the mosaic.

On Monday evening, November 2nd, the first ordinary meeting of the Edinburgh Dental Students' Society took place in the hospital. The room was crowded, and altogether the event was very successful. Mr. Edwin A. Cormack, the President, occupied the chair. Mr. W. Bowman Macleod, Honorary President, delivered an interesting and suggestive inaugural address; Dr. W. Wilson following with a paper entitled "Some Points in Anæsthesia." The various points in the latter paper led to a somewhat heated discussion, in which Messrs. Johnstone, Munroe and Purdie took part.

Monthly Statement of operations performed at the two Dental Hospitals in London and the Birmingham Dental Hospital, from October 1st to October 31st, 1885:—

		National.	London.	Birmingham.
Number of Patients attended		1,827	2,460	970
Extractions	Children under 14	424	378	701
	Adults	555	912	
	Under Nitrous Oxide	614	276	14
Gold Stoppings		121	267	3
Other Stoppings		625	879	241
Advice and Scaling		421	121	—
Irregularities of the Teeth		409	97	—
Miscellaneous		146	387	28
Total...		3,315	3,317	987

End of Vol. V.

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H.R.Abbott
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